Scheda di sicurezza
AC.FOSFORICO 75% - 53 Bè

Scheda di sicurezza del 18/9/2020, revisione 3

SEZIONE 1: identificazione della sostanza/miscela e della società/impresa

1.1. Identificatore del prodotto

Identificazione della sostanza:

Nome commerciale:	AC.FOSFORICO 75%-53 Bè
Codice commerciale:	ACI075
Numero CAS:	7664-38-2
Numero EC:	231-633-2
Numero Index:	015-011-00-6

Numero REACH: 01-2119485924-24

1.2. Usi identificati pertinenti della sostanza o della miscela e usi sconsigliati

Uso raccomandato:
Per informazioni dettagliate sugli usi identificati del prodotto, si consulti l'allegato alla scheda dei dati di sicurezza
Uso Industriale
Uso professionale
Utilizzo privato
Usi sconsigliati:
Questo prodotto non è raccomandato per usi industriali ,professionali o consumatori diversi da quelli individuati negli scenari espositivi in allegato.

1.3. Informazioni sul fornitore della scheda di dati di sicurezza

Fornitore:
Rainoldi SpA
Via dell'Industria 15
21052 Busto Arsizio (VA)
ITALIA
TELEFONO : +39 0331.327.311
FAX : +39 0331.351.950
SITO WEB : www.rainoldi.it

Persona competente responsabile della scheda di sicurezza:
sicurezza@rainoldi.it

1.4. Numero telefonico di emergenza

Ospedale Milano Niguarda +39 02 66101029

SEZIONE 2: identificazione dei pericoli

2.1. Classificazione della sostanza o della miscela

Criteri Regolamento CE 1272/2008 (CLP):
autoclassificazione : sì


Attenzione, Met. Corr. 1, Può essere corrosivo per i metalli.


Attenzione, Acute Tox. 4, Nocivo se ingerito.


Pericolo, Skin Corr. 1B, Provoca gravi ustioni cutanee e gravi lesioni oculari.


Pericolo, Eye Dam. 1, Provoca gravi lesioni oculari.

Effetti fisico-chimici dannosi alla salute umana e all'ambiente:
Nessun altro pericolo

2.2. Elementi dell'etichetta

Pittogrammi di pericolo:

Pericolo

Indicazioni di pericolo:

H290 Può essere corrosivo per i metalli.
H302 Nocivo se ingerito.
H314 Provoca gravi ustioni cutanee e gravi lesioni oculari.

Consigli di prudenza:

P280 Indossare guanti/indumenti protettivi/proteggere gli occhi/proteggere il viso/proteggere l'udito/...
P301+P330+P331 IN CASO DI INGESTIONE: sciacquare la bocca. NON provocare il vomito.
P303+P361+P353 IN CASO DI CONTATTO CON LA PELLE (o con i capelli): togliersi di dosso immediatamente tutti gli indumenti contaminati. Sciacquare la pelle [o fare una doccia].
P305+P351+P338 IN CASO DI CONTATTO CON GLI OCCHI: sciacquare accuratamente per parecchi minuti. Togliere le eventuali lenti a contatto se è agevole farlo. Continuare a sciacquare.
P310 Contattare immediatamente un CENTRO ANTIVELENI/un medico...
P405 Conservare sotto chiave.
P501 Smaltire il prodotto/recipiente in conformità alla regolamentazione.

Disposizioni speciali:

Nessuna

Disposizioni speciali in base all'Allegato XVII del REACH e successivi adeguamenti:

Nessuna

2.3. Altri pericoli

Sostanze vPvB: Nessuna - Sostanze PBT: Nessuna

Altri pericoli:

Corrossivo per il tratto respiratorio e per l'ingestione. Conformemente al regolamento (CE) n. 1272/2008 (EU CLP), si propone di classificare l'acido fosforico come corrosivo per i metalli (H290) a concentrazioni> 20%.

SEZIONE 3: composizione/informazioni sugli ingredienti

3.1. Sostanze

Identificazione della sostanza:
Caratterizzazione chimica: acido fosforico ...%; acido ortofosforico ...%

Percentuale	75%
Codice commerciale:	ACI075
Numero CAS:	7664-38-2
Numero EC:	231-633-2

Numero REACH: 01-2119485924-24

3.2. Miscele

N.A.

SEZIONE 4: misure di primo soccorso

4.1. Descrizione delle misure di primo soccorso

In caso di contatto con la pelle:

Togliere di dosso immediatamente gli indumenti contaminati.
CONSULTARE IMMEDIATAMENTE UN MEDICO.
Togliere immediatamente gli indumenti contaminati ed eliminarli in modo sicuro.
In caso di contatto con la pelle lavare immediatamente con acqua abbondante e sapone.

In caso di contatto con gli occhi:
In caso di contatto con gli occhi risciacquarli con acqua per un intervallo di tempo adeguato e tenendo aperte le palpebre, quindi consultare immediatamente un oftalmologo.
Proteggere l'occhio illeso.
In caso di ingestione:
NON indurre il vomito.
Non dare nulla da mangiare o da bere.
In caso di inalazione:
Portare l'infortunato all'aria aperta e tenerlo al caldo e a riposo.

4.2. Principali sintomi ed effetti, sia acuti che ritardati

Effetti acuti dose-dipendenti:
Cute: irritazione,ustione,corrosione.
Occhi:irritazione,cheratite,danno corneale.

Cavo orale :
Naso : irritazione
Prime vie aeree : irritazione
Polmoni : irritazione

Effetti cronici : non sono attualmente disponibili dati relativi ad effetti cronici.

4.3. Indicazione dell'eventuale necessità di consultare immediatamente un medico e di trattamenti speciali

In caso d'incidente o malessere consultare immediatamente un medico (se possibile mostrare le istruzioni per l'uso o la scheda di sicurezza).
Trattamento:
Utile intervento medico urgente.
Può esserci un edema polmonare ritardato sino a 48 ore.

SEZIONE 5: misure antincendio

5.1. Mezzi di estinzione

Mezzi di estinzione idonei:
Anidride Carbonica
Schiumogeni adatti per solventi polari
Polveri chimiche
Sabbia o inerti (per incendi di modesta entità)
Mezzi di estinzione che non devono essere utilizzati per ragioni di sicurezza:
Nessuno in particolare.

5.2. Pericoli speciali derivanti dalla sostanza o dalla miscela

Allontanare se possibile i contenitori dall'incendio e raffreddare, poichè se la sostanza è esposta a irraggiamento termico o direttamente coinvolta, può dare origine a fumi tossici.
Allontanare se possibile i contenitori dal luogo dell'incendio e raffreddare, poichè la sostanza a contatto con metalli ed esposta ad irraggiamento termico libera gas infiammabili.

5.3. Raccomandazioni per gli addetti all'estinzione degli incendi

Maschera antigas con autorespiratore
Equipaggiamento completo composto da elmetto a visiera e protezione del collo,giacca e pantaloni ignifughi con fasce intorno a braccia , gambe e vita.
Per quanto non previsto in questo punto,fare riferimento ai dispositivi di protezione consigliati al punto 8.

SEZIONE 6: misure in caso di rilascio accidentale

6.1. Precauzioni personali, dispositivi di protezione e procedure in caso di emergenza

Indossare i dispositivi di protezione individuale.
Spostare le persone in luogo sicuro.
Consultare le misure protettive esposte al punto 7 e 8.

6.2. Precauzioni ambientali

Impedire la penetrazione nel suolo/sottosuolo. Impedire il deflusso nelle acque superficiali o nella rete fognaria.
Abbattere i vapori con acqua nebulizzata; può essere utilizzata acqua nebulizzata per diluire i vapori.

6.3. Metodi e materiali per il contenimento e per la bonifica

Per il contenimento:
Può essere efficace coprire con un telo di plastica per evitare la dispersione della sostanza.
Raccogliere meccanicamente il materiale versato.
Per la bonifica:
Lavare il pavimento con acqua dopo aver raccolto lo spanto.
Introdurre il materiale raccolto in recipienti puliti ed etichettati.
Neutralizzare con limo, argilla, o bicarbonato di sodio.
Se necessario, avviare la procedura di bonifica prevista ai sensi del D.Lgs.152/2006,parte IV,titolo V.
Altre informazioni:
Per quanto non previsto in questo punto, fare riferimento ai dispositivi di protezione consigliati al punto 8.

6.4. Riferimento ad altre sezioni

Vedi anche paragrafo 8 e 13

SEZIONE 7: manipolazione e immagazzinamento

7.1. Precauzioni per la manipolazione sicura

Evitare il contatto con la pelle e gli occhi, l'inalazione di vapori e nebbie.
Non utilizzare contenitori vuoti prima che siano stati puliti.
Prima delle operazioni di trasferimento assicurarsi che nei contenitori non vi siano materiali incompatibili residui.
Si rimanda anche al paragrafo 8 per i dispositivi di protezione raccomandati.
Raccomandazioni generali sull'igiene del lavoro:
Gli indumenti contaminati devono essere sostituiti prima di accedere alle aree da pranzo.
Durante il lavoro non mangiare né bere.

7.2. Condizioni per lo stoccaggio sicuro, comprese eventuali incompatibilità

Conservare nei contenitori originali in un luogo asciutto.
Proteggere dal danneggiamento,dagli urti accidentali e dalle cadute.
Proteggere dall'irraggiamento solare diretto.
Stoccare lontano da materiali incompatibili: caustici forti,nitrometano,cloruri,aldeidi,cianuri,mercaptani,solfuri,fluoruri,composti organici alogenati,perossidi organici,alcoli,fenoli,chetoni,esteri,epossidi,azocomposti.
Non utilizzare recipienti in acciaio inossidabile o metallici.
Tenere lontano da cibi, bevande e mangimi.
Materie incompatibili:
Nessuna in particolare.
Indicazione per i locali:
Locali adeguatamente areati.

7.3. Usi finali particolari

Nessun uso particolare

SEZIONE 8: controllo dell'esposizione/protezione individuale

8.1. Parametri di controllo

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

- Tipo OEL: OEL-TWA - TWA(8h): 1 mg/m3 - Note: (valore limite comunitari)
- Tipo OEL: OEL-STEL - TWA(15 minuti): 2 mg/m3 - Note: (Dir.2000/39/CE valori limite comunitari)
- Tipo OEL: UE - TWA(8h): 1 mg/m3 - STEL: 2 mg/m3

- Tipo OEL: ACGIH - TWA(8h): 1 mg/m3 - STEL: 3 mg/m3 - Note: URT, eye and skin irr

Valori limite di esposizione DNEL

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

Lavoratore professionale: 10.7 mg/m3 - Consumatore: 4.57 mg/m3 - Esposizione: Inalazione Umana - Frequenza: Lungo termine, effetti sistemici

Lavoratore professionale: 1 mg/m3 - Consumatore: 0.36 mg/m3 - Esposizione: Inalazione Umana - Frequenza: Lungo termine, effetti locali

Lavoratore professionale: 2 mg/m3 - Esposizione: Inalazione Umana - Frequenza: Breve termine, effetti locali

Consumatore: 0.1 mg/kg bw/giorno - Esposizione: Orale Umana - Frequenza: Lungo termine, effetti sistemici

Valori limite di esposizione PNEC

N.A.

8.2. Controlli dell'esposizione

Protezione degli occhi:

Schermo facciale.

Visiera, non usare lenti a contatto.

Protezione della pelle:

Stivale resistente ai prodotti chimici.

Grembiule resistente ai prodotti chimici

Protezione delle mani:

PVC (tempo di permeabilità 6 ore)

Nitrile (tempo di permeabilità 6 ore)

Lattice (tempo di permeabilità 6 ore)

Neoprene (tempo di permeabilità 6 ore)

Protezione respiratoria:

Filtri E 1 : gas e vapori acidi

Maschera pieno facciale

Rischi termici:

Indossare guanti anticalore in caso di pericoli termici

Controlli dell'esposizione ambientale:

Non immettere il prodotto non diluito o in grandi quantità nelle acque freatiche , nei corsi d'acqua o nelle fognature.

Controlli tecnici idonei:

Nessuno

SEZIONE 9: proprietà fisiche e chimiche

9.1. Informazioni sulle proprietà fisiche e chimiche fondamentali

Proprietà	Valore	Metodo:	Note
Aspetto e colore:	Liquido,incolore	--	--
Odore:		--	--
Soglia di odore:		--	--
pH:	<1	--	--
Punto di fusione/congelamento:	- 41 °C	--	--
Punto di ebollizione iniziale e intervallo di ebollizione:	135°C	--	al 75%
Punto di infiammabilità:	N.A.	--	--
Velocità di evaporazione:	N.A.	--	--
Infiammabilità solidi/gas:		--	--
Limite superiore/inferiore		--	--

d'infiammabilità o esplosione:			
Pressione di vapore:	75 Pa a 20°C	--	al 75%
Densità dei vapori:	3.4 (aria=1) a 20°C g/cm3	--	--
Densità relativa:	1.574	ISO 387	(INRS , 2011)
Idrosolubilità:		--	--
Solubilità in olio:		--	--
Coefficiente di ripartizione (n-ottanolo/acqua):	N.A.	--	--
Temperatura di autoaccensione:	N.A.	--	--
Temperatura di decomposizione:	si decompone sotto il punto di ebollizione a 213°C	--	--
Viscosità:	3.86 mPa.s	--	--
Proprietà esplosive:		--	--
Proprietà ossidanti:		--	--

9.2. Altre informazioni

Proprietà	**Valore**	**Metodo:**	**Note**
Miscibilità:		--	--
Liposolubilità:		--	--
Conducibilità:	N.A.	--	--
Proprietà caratteristiche dei gruppi di sostanze	N.A.	--	--

SEZIONE 10: stabilità e reattività

10.1. Reattività

A contatto con l'acqua può avvenire una reazione esotermica.
A contatto con metalli reattivi (acciaio dolce, alluminio etc.) può svilupparsi idrogeno (esplosivo).
Reazione con riducenti.

10.2. Stabilità chimica

Stabile nelle normali condizioni.

10.3. Possibilità di reazioni pericolose

Aggiungere l'acido in acqua lentamente e con simultanea agitazione.
Quando si miscela con l'acqua non lasciare che la miscela raggiunga temperature troppo alte.

10.4. Condizioni da evitare

Evitare di esporre il prodotto ad alte temperature.

10.5. Materiali incompatibili

Ammoniaca.
Basi forti.
Metalli reattivi.

10.6. Prodotti di decomposizione pericolosi

Composti tossici del fosforo

SEZIONE 11: informazioni tossicologiche

11.1. Informazioni sugli effetti tossicologici

Informazioni tossicologiche riguardanti la sostanza:
acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

a) tossicità acuta
Il prodotto è classificato: Acute Tox. 4 H302
Test: LD50 - Via: Orale - Specie: Ratto 300 mg/kg - Fonte: CSR
b) corrosione/irritazione cutanea
Il prodotto è classificato: Skin Corr. 1B H314
Test: Corrosivo per la pelle - Via: Contatto - Specie: Coniglio - Durata: 4h - Fonte: ISS - Induce irritazione a partire da una concetrazione del 75%; all'80%, l'irritazione è severa, all'85% è corrosiva (necrosi) (INRS,2011)
c) lesioni oculari gravi/irritazioni oculari gravi
Il prodotto è classificato: Eye Dam. 1 H318
Test: Corrosivo per gli occhi - Via: Contatto - Specie: Uomo - Fonte: ISS - La sostanza ha azione corrosiva. Varia in relazione alla concentrazione della soluzione,alla quantità e alla durata del contatto.Può provocare colorazione giallastra della cute.Si osserva eritema caldo e doloroso,flittene o necrosi.Si può complicare
d) sensibilizzazione respiratoria o cutanea
Non classificato
Test: Sensibilizzazione per inalazione - Via: Inalazione - Specie: Uomo - Fonte: ISS - l'inalazione della sostanza può causare una sindrome di Brooks (asma indotta da irritanti) (INRS,2011)
e) mutagenicità delle cellule germinali
Non classificato
Specie: Uomo - Fonte: ISS - In vitro ha fornito risultati negativi nel saggio di Ames,con o senza attivazione metabolica.In vivo un saggio di ricombinazione genica su Drosophila ha fornito risultato negativo.Un saggio sui letali dominanti,eseguito su ratto,ha mostrato un aumen
f) cancerogenicità
Non classificato
Specie: Uomo - Fonte: ISS - Una recente valutazione ha mostrato associazione tra esposizione a nebbie di ac.inorganici forti e cancro laringeo nell'uomo mentre sono risultati limitati per affermare un associazione causale con cancro bronchiale.
Nell'uomo è stata osservata inolt
g) tossicità per la riproduzione
Non classificato
Test: Tossicità per la riproduzione - Via: Inalazione - Specie: Ratto - Fonte: ISS - Fetotossico in caso di esposizione a concentrazione elevate per via inalatoria (INRS 2011)
h) tossicità specifica per organi bersaglio (STOT) — esposizione singola
Non classificato
Sulla base dei dati disponibili, i criteri di classificazione non sono soddisfatti.
i) tossicità specifica per organi bersaglio (STOT) — esposizione ripetuta
Non classificato
Sulla base dei dati disponibili, i criteri di classificazione non sono soddisfatti.
j) pericolo in caso di aspirazione
Non classificato
Sulla base dei dati disponibili, i criteri di classificazione non sono soddisfatti.
Effetti negativi sulla salute
Vie probabili di esposizione : Le principali vie di esposizione potenziale si prevede possano essere il contatto cutaneo e l'inalazione nei lavoratori esposti alla produzione e all'uso della sostanza.

SEZIONE 12: informazioni ecologiche

12.1. Tossicità

Utilizzare secondo le buone pratiche lavorative, evitando di disperdere il prodotto nell'ambiente.

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

Non classificato per i pericoli per l'ambiente

Sulla base dei dati disponibili, i criteri di classificazione non sono soddisfatti.

a) Tossicità acquatica acuta:

Endpoint: EC50 - Specie: Alghe > 100 mg/l - Durata h: 72
Endpoint: EC50 - Specie: Dafnie > 100 mg/l - Durata h: 48
Endpoint: LC50 - Specie: Pesci = 75.1 mg/l - Durata h: 96

12.2. Persistenza e degradabilità

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

Biodegradabilità: A 200°C diventa acido pirofosforico
Biodegradabilità: A 300°C diventa acido metafosforico
Biodegradabilità: Degrada in condizioni anaerobiche

12.3. Potenziale di bioaccumulo

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

Dato non disponibile

12.4. Mobilità nel suolo

acido fosforico ...%; acido ortofosforico ...% - CAS: 7664-38-2

La sostanza reagisce chimicamente con i componenti alcalini al suolo formando composti più o meno solubili (in funzione del pH finale)

12.5. Risultati della valutazione PBT e vPvB

Sostanze vPvB: Nessuna - Sostanze PBT: Nessuna

12.6. Altri effetti avversi

Nessuno

SEZIONE 13: considerazioni sullo smaltimento

13.1. Metodi di trattamento dei rifiuti

Recuperare se possibile. Inviare ad impianti di smaltimento autorizzati o ad incenerimento in condizioni controllate. Operare secondo le vigenti disposizioni locali e nazionali.

SEZIONE 14: informazioni sul trasporto

14.1. Numero ONU

ADR-Numero ONU:	1805
IATA-Numero ONU:	1805
IMDG-Numero ONU:	1805

14.2. Nome di spedizione dell'ONU

ADR-Nome di Spedizione:	ACIDO FOSFORICO , IN SOLUZIONE
IATA-Nome tecnico:	Phosporic acid-solution
IMDG-Nome tecnico:	PHOSPHORIC ACID, SOLUTION (PHOSPHORIC ACID)

14.3. Classi di pericolo connesso al trasporto

ADR-Classe:	8
ADR-Etichetta:	8
ADR - Numero di identificazione del pericolo:	80
IATA-Classe:	8
IATA-Etichetta:	8
IMDG-Classe:	8

14.4. Gruppo di imballaggio

ADR-Gruppo di imballaggio:	III
IATA-Gruppo di imballaggio:	III
IMDG-Gruppo di imballaggio:	III

14.5. Pericoli per l'ambiente

Marine pollutant:	No

14.6. Precauzioni speciali per gli utilizzatori

ADR-Categoria di trasporto (Codice di restrizione in galleria): E
Ferroviario (RID): ACIDO FOSFORICO , IN SOLUZIONE
IMDG-Nome tecnico: PHOSPHORIC ACID, SOLUTION (PHOSPHORIC ACID)
IMDG-EMS: F-A S-B

14.7. Trasporto di rinfuse secondo l'allegato II di MARPOL ed il codice IBC

N.A.

SEZIONE 15: informazioni sulla regolamentazione

15.1. Disposizioni legislative e regolamentari su salute, sicurezza e ambiente specifiche per la sostanza o la miscela

D.Lgs. 9/4/2008 n. 81
D.M. Lavoro 26/02/2004 (Limiti di esposizione professionali)
Regolamento (CE) n. 1907/2006 (REACH)
Regolamento (CE) n. 1272/2008 (CLP)
Regolamento (CE) n. 790/2009 (ATP 1 CLP) e (UE) n. 758/2013
Regolamento (UE) 2015/830
Regolamento (UE) n. 286/2011 (ATP 2 CLP)
Regolamento (UE) n. 618/2012 (ATP 3 CLP)
Regolamento (UE) n. 487/2013 (ATP 4 CLP)
Regolamento (UE) n. 944/2013 (ATP 5 CLP)
Regolamento (UE) n. 605/2014 (ATP 6 CLP)
Regolamento (UE) n. 2015/1221 (ATP 7 CLP)
Regolamento (UE) n. 2016/918 (ATP 8 CLP)
Regolamento (UE) n. 2016/1179 (ATP 9 CLP)
Regolamento (UE) n. 2017/776 (ATP 10 CLP)
Regolamento (UE) n. 2018/669 (ATP 11 CLP)
Regolamento (UE) n. 2018/1480 (ATP 13 CLP)
Regolamento (UE) n. 2019/521 (ATP 12 CLP)

Restrizioni relative al prodotto o alle sostanze contenute in base all'Allegato XVII del Regolamento (CE) 1907/2006 (REACH) e successivi adeguamenti:

Restrizioni relative al prodotto:
Restrizione 3
Restrizioni relative alle sostanze contenute:
Nessuna restrizione.

Ove applicabili, si faccia riferimento alle seguenti normative:

Circolari ministeriali 46 e 61 (Ammine aromatiche).
Direttiva 2012/18/EU (Seveso III)
Regolamento 648/2004/CE (Detergenti).
D.L. 3/4/2006 n. 152 Norme in materia ambientale
Dir. 2004/42/CE (Direttiva COV)

Disposizioni relative alla direttiva EU 2012/18 (Seveso III):

N.A.

15.2. Valutazione della sicurezza chimica

È stata effettuata una valutazione della sicurezza chimica per la sostanza

SEZIONE 16: altre informazioni

Classe e categoria di pericolo	Codice	Descrizione
Met. Corr. 1	2.16/1	Sostanza o miscela corrosiva per i metalli, Categoria 1
Acute Tox. 4	3.1/4/Oral	Tossicità acuta (per via orale), Categoria 4
Skin Corr. 1B	3.2/1B	Corrosione cutanea, Categoria 1B

Eye Dam. 1	3.3/1	Gravi lesioni oculari, Categoria 1

Questo documento e' stato redatto da un tecnico competente in materia di SDS e che ha ricevuto formazione adeguata.
Principali fonti bibliografiche:

ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities
SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van Nostrand Reinold
CCNL - Allegato 1
Istituto Superiore di Sanità - Inventario Nazionale Sostanze Chimiche

Le informazioni ivi contenute si basano sulle nostre conoscenze alla data sopra riportata. Sono riferite unicamente al prodotto indicato e non costituiscono garanzia di particolari qualità.
L'utilizzatore è tenuto ad assicurarsi della idoneità e completezza di tali informazioni in relazione all'utilizzo specifico che ne deve fare.
Questa scheda annulla e sostituisce ogni edizione precedente.

ADR:	Accordo europeo relativo al trasporto internazionale stradale di merci pericolose.
CAS:	Chemical Abstracts Service (divisione della American Chemical Society).
CLP:	Classificazione, Etichettatura, Imballaggio.
DNEL:	Livello derivato senza effetto.
EINECS:	Inventario europeo delle sostanze chimiche europee esistenti in commercio.
GefStoffVO:	Ordinanza sulle sostanze pericolose in Germania.
GHS:	Sistema globale armonizzato di classificazione e di etichettatura dei prodotti chimici.
IATA:	Associazione per il trasporto aereo internazionale.
IATA-DGR:	Regolamento sulle merci pericolose della "Associazione per il trasporto aereo internazionale" (IATA).
ICAO:	Organizzazione internazionale per l'aviazione civile.
ICAO-TI:	Istruzioni tecniche della "Organizzazione internazionale per l'aviazione civile" (ICAO).
IMDG:	Codice marittimo internazionale per le merci pericolose.
INCI:	Nomenclatura internazionale degli ingredienti cosmetici.
KSt:	Coefficiente d'esplosione.
LC50:	Concentrazione letale per il 50 per cento della popolazione di test.
LD50:	Dose letale per il 50 per cento della popolazione di test.
PNEC:	Concentrazione prevista senza effetto.
RID:	Regolamento riguardante il trasporto internazionale di merci pericolose per via ferroviaria.
STA:	Stima della tossicità acuta
STAmix:	Stima della tossicità acuta (Miscele)
STEL:	Limite d'esposizione a corto termine.
STOT:	Tossicità organo-specifica.
TLV:	Valore limite di soglia.
TWA:	Media ponderata nel tempo
WGK:	Classe di pericolo per le acque (Germania).

CHEMICAL SAFETY REPORT

Substance Name: orthophosphoric acid

EC Number: 231-633-2

CAS Number: 7664-38-2

Registrant's Identity: Regulatory Facilitation Company Limited

Table of Contents

Part A

1. SUMMARY OF RISK MANAGEMENT MEASURES

2. DECLARATION THAT RISK MANAGEMENT MEASURES ARE IMPLEMENTED

3. DECLARATION THAT RISK MANAGEMENT MEASURES ARE COMMUNICATED

Part B

1. IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

1.1. Name and other identifiers of the substance

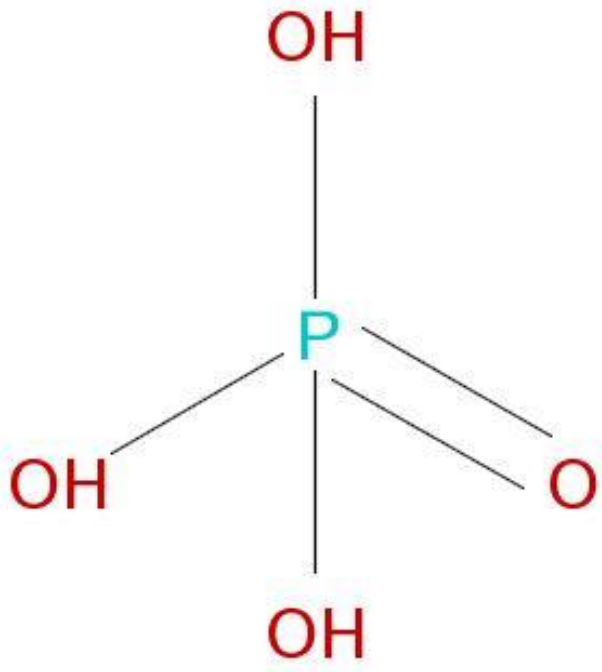
The substance **orthophosphoric acid** is a mono constituent substance (origin: inorganic) having the following characteristics and physical–chemical properties (see the IUCLID dataset for further details).

The following public name is used: Phosphoric acid.

Table 1. Substance identity

EC number:	231-633-2
EC name:	orthophosphoric acid
CAS number (EC inventory):	7664-38-2
CAS name:	phosphoric acid
IUPAC name:	phosphoric acid
Annex I index number:	015-011-00-6
Molecular formula:	H3O4P
Molecular weight range:	97.9952

Structural formula:



1.2. Composition of the substance

1.3. Physicochemical properties

Table 2. Physicochemical properties

Property	Description of key information	Value used for CSA / Discussion
Physical state	One key study is available. In addition, a number of literature sources providing peer-reviewed data are provided as supporting evidence.	**Value used for CSA:** solid at 20°C and 101.3 kPa The key study and two of the handbook sources report anhydrous phosphoric acid to be crystalline at 20°C. Phosphoric acid is mainly marketed as an aqueous solution and therefore supporting data from two peer-reviewed handbooks which indicate phosphoric acid to be a colourless viscous liquid are also included.
Melting / freezing point	The melting point of Phosphoric Acid was determined in accordance with test guideline EC A.1 to be 41.1 °C, following the Differential Scanning Calorimetry method (Holzschuh, 2010).	**Value used for CSA:** 41.1 °C at 101.3 kPa Although six supporting data indicate a melting point at 42.3 - 42.4°C, most of the values can be considered identical and thus it is questionable whether or not they result from independent sources. Furthermore, most sources do not describe the physical state of the test item. Therefore the value from the recent melting point study is used for the CSA.
Boiling point	The boiling point of Phosphoric Acid was determined in accordance with test guideline EC A.2 to be 296.5 °C, following the method according to Siwoloboff (Holzschuh, 2010).	**Value used for CSA:** 296.5 °C at 101.3 kPa Three supporting studies indicate a boiling point at 407°C, 260°C and 213°C without specifying the physical state of the test item. Further data provide a boiling point at 213°C (hemihydrate), 261°C (100% solution), 158°C (85% solution), 135°C (75% solution) and 108°C (50% solution). As the available supporting data are not conclusive, the value from the recent boiling point study is used for the CSA. This boiling point was obtained at 98300 Pa, but no corrections for the pressure were made as this correction is within the error of measurement for this method.
Relative density	The relative density of phosphoric acid was determined in accordance with test guideline EC A.3 to be 1.840 at 38 °C, following the pycnometer method (Holzschuh, 2010).	The density of phosphoric acid was determined with a glass pycnometer at 40 °C in liquid form instead at 20 °C as solid. This deviation in measurement conditions was unavoidable as phosphoric acid is hygroscopic and corrosive. Stable conditions for measurements in helium pycnometer for solids could not be achieved. In support of the density of phosphoric acid, supporting data from 10 handbooks provide (relative) densities of the different

Property	Description of key information	Value used for CSA / Discussion
		aqueous solutions of phosphoric acid. Although not always the temperature of measurement is reported, the following relative densities can be concluded: 100% solution: 1.86 to 1.87 at 20 °C to 30 °C 85% solution: 1.69 to 1.83 at 18 °C to 25 °C 75% solution: 1.57 to 1.58 at 20 °C to 30 °C 50% solution: 1.33 to 1.34 at 20 °C to 30 °C 30% solution: 1.1794 (two values, one at 25 °C and one at unspecified temperature) 10% solution: 1.0517 (one value at 25 °C) **Value used for CSA: 1.840 at 38 °C**
Vapour pressure	WoE approach based on handbook data. The values range from 2.9 to 4 Pa.	**Value used for CSA:** 4 Pa at 20 °C Data from four peer-reviewed handbooks provide vapour pressures of 2.9 to 4 Pa at 20°C to 25°C. Two sources do not mention the physical form or the concentration (Vp of 4Pa). In two sources the physical form was reported, in the first one it was reported to be a 101% aqueous solution and in the second one it was reported to be 100% clear crystal (Vp 3Pa). Some additional supporting sources provide data as: - Aqueous partial vapour pressure of H2O vapor at 25°C to be <133 Pa for an aqueous solution of concentration >90%. - Vapour pressures of different acids with variable content of P4O10 at elevated temperature - Water activity over phosphoric acid - A test was launched in 2010 (Holzschuh, 2010) in order to determine vapour pressure of the solid phosphoric acid (100%), nevertheless due to corrosive and hydroscopic properties of the substance, the test was quite difficult to perform. Additionally only an estimation of the vapour pressure could be obtained, it was determined that the vapour pressure of phosphoric acid as supercooled liquid at 25°C is under 0.8 mbar (80Pa). Due to the sensitivity of the method, 20 mbar +/- 10

Property	Description of key information	Value used for CSA / Discussion
		mbar, the order of magnitude of the value is questionable. In a conservative approach, the value of 4Pa is used as a key study for the chemical safety assessment.
Water solubility	Weight of evidence approach based on peer-reviewed handbook values (highly soluble, 5480 g/L; miscible). Taking its hygroscopic properties into consideration, it is concluded that phosphoric acid is miscible with water.	**Value used for CSA:** 1000 g/L at 20 °C Phosphoric acid is miscible with water; therefore it was concluded that the water solubility is greater than 1000 g/L at 20°C. **Value used for CSA:** 1000 g/L at 20°C.
Flammability	No study data available.	**Value used for CSA:** non flammable
Explosive properties	No study data available.	**Value used for CSA:** non explosive
Oxidising properties		**Value used for CSA:** Oxidising: no
Dissociation constant	Peer-reviewed public domain data provided the three dissociation constants for phosphoric acid in the range of pKa1= 2.1 - 2.2, pKa2=7.1 - 7.2 and pKa3=12.3 - 12.4. Temperature of measurement (where reported) was 25 deg C.	As the reported pKa values are in a close range, the mean rounded-up values were taken. Temperature of measurement was either 25°C or not reported. It is anticipated that the calculated rounded-up values are applicable at a temperature of 20°C.**Value used for CSA: pKa1 = 2.1, pKa2 = 7.2, pKa3 = 12.3 at 20°C**
Viscosity	Phosphoric acid on its purest state is an (inorganic) solid, so viscosity is considered not to be a relevant parameter. Nevertheless as phosphoric acid is produced and handled most of the time as a liquid, available supporting data are provided. They show viscosities of 5% to 105% aqueous solutions of Phosphoric Acid in the range of 1.1 to 600 mPa.s at 20°C.	Supporting data from six handbooks show increasing vicosity with increasing phosphoric acid concentrations in aqueous solutions. Viscosities range from 1.1 cP (mPa.s) at 5% Phosphoric Acid to 600 cP (mPa.s) at 105% Phosphoric Acid, at 20°C.

Data waiving

Information requirement: Granulometry

Reason: study scientifically unjustified

Justification: In accordance with Annex VII, Section 7.14, Column 2 of Regulation (EC) No. 1907/2006 (REACH), a study for granulometry does not need to be conducted if the substance is marketed or used in a non-solid or granular form. Phosphoric acid is primarily marketed and used as a liquid solution therefore a study does not need to be conducted. Further, solid phosphoric acid is hygroscopic and as such small particles will not be present due to agglomeration and a study for granulometry is not technically feasible on this form of the substance.

Information requirement: Partition coefficient n-octanol/water (log value)

Reason: other justification

Justification: In accordance with Annex VII, Section 7.8, Column 2 of Regulation No. 1907/2006 (REACH), the partition coefficient n-octanol/water does not need to be assessed for inorganic chemicals. Phosphoric acid is an inorganic chemical and therefore the partition coefficient n-octanol/water study does not need to be conducted.

Information requirement: Surface tension

Reason: other justification

Justification: In accordance with Annex VII, Section 7.6, Column 2 of Regulation (EC) No. 1907/2006 (REACH), the study need only be conducted if:

- based on structure, surface activity is expected or predicted, or

- surface activity is a desired property of the material.

In accordance with Article 2(6) of Regulation 648/2004, a surface active substance (surfactant) is defined as "any organic substance and/or mixture used in detergents, which has surface-active properties and which consists of one or more hydrophilic and one or more hydrophobic groups of such a nature and size that it is capable of reducing the surface tension of water, and of forming spreading or adsorption monolayers at the water-air interface, and of forming emulsions and/or microemulsions and/or micelles, and of adsorption at water-solid interfaces".

Phosphoric acid is an inorganic substance, thus not fulfilling the above definition of a surfactant. Based on the structure of phosphoric acid, surface activity is neither expected nor can be predicted and as such a study on surface activity does not need to be conducted.

Information requirement: Flash point

Reason: other justification

Justification: In accordance with Annex VII, Section 7.9, Column 2 of Regulation (EC) No. 1907/2006 (REACH), the flash point does not need to be assessed for inorganic chemicals. Phosphoric acid is an inorganic chemical and therefore a study does not need to be conducted.

Information requirement: Self-ignition temperature

Reason: study scientifically unjustified

Justification: In accordance with Annex VII, Section 7.12, column 2 of Regulation (EC) No. 1907/2006 (REACH) a self-ignition study does not need to be conducted if the solid substance has a melting point of ≤160°C. The melting point of phosphoric acid is 41.1°C and therefore no study is required.

Information requirement: Flammability

Reason: study scientifically unjustified

Justification: In accordance with the introductory text of Annex VII-X of Regulation (EC) No. 1907/2006 (REACH), when, for certain endpoints, information is not provided for reasons other than those stated in column 2 of the respective Annex or in Annex XI, this fact and the reasons shall be clearly stated.

There are no experimental data available on the flammability of phosphoric acid. Information for this endpoint or an adaptation according to Column 2 of Section 7.10, Annex VII or Annex XI is not provided. Nevertheless, testing for flammability does not appear scientifically necessary for the following reasons:

The Guidance on the Application of the CLP Criteria, version 4.0, states that 'flammability testing may be waived in cases where the substance is commonly known to be not flammable (i. e. stable salts or metal oxides) or where a flammability hazard can be excluded by any other scientific reasoning. '

Inorganic oxides in which the inorganic element is in its highest possible oxidation state are incapable of further reaction with oxygen and can thus be designated as non-flammable. The oxidation state of phosphorus in phosphoric acid is in its highest possible state (+5).

In the daily use and handling of phosphoric acid during which continuous exposure to air can occur, no spontaneous ignition is observed. The absence of structural alerts furthermore confirms that it is highly unlikely that phosphoric acid has pyrophoric properties.

Phosphoric acid is mainly used as a dilution in water. Under these use conditions in contact with water no ignition and/or liberation of flammable gases is observed. The absence of structural alerts furthermore confirms that phosphoric acid is not flammable in contact with water.

Based on its chemical nature and the reasoning above, the substance is considered to be non-flammable and testing may be waived as it does not appear scientifically necessary.

Information requirement: Explosive properties

Reason: study scientifically unjustified

Justification: In accordance with Annex VII, Section 7.11, column 2 of Regulation (EC) No. 1907/2006 (REACH), the study does not need to be conducted if:

- There are no chemical groups associated with explosive properties present in the molecule.

The structure of phosphoric acid has been assessed for chemical groups that are associated with explosivity. Examples of such groups are: C-C unsaturated, C-metal, N-metal, contiguous oxygen atoms, contiguous nitrogen atoms, N-halogens, O-halogens, N-O. It is concluded phosphoric acid does not possess any functional groups associated with explosive properties nor is it capable of rapid decomposition with evolution of gases or release of heat. Taking Appendix 6 of UN recommendations for the use of screening procedures to assess explosive properties and the ECHA Endpoint specific guidance (R.7a) into consideration, testing of phosphoric acid for explosive properties does not need to be conducted.

Information requirement: Oxidising properties

Reason: study scientifically unjustified

Justification: In accordance with Annex VII, Section 7.13, Column 2 of Regulation (EC) No. 1907/2006 (REACH), the study does not need to be conducted if:

- The substance is incapable of reacting exothermically with combustible material, for example on the basis of chemical structure.

Furthermore, in accordance with EU Method, A17 Oxidising Properties (solids) of Commission Regulation (EC) No. 448/2008 ‘this test need not be performed when examination of the structural formula establishes beyond reasonable doubt that the substance is incapable of reacting exothermically with a combustible material.

Taking into account Appendix 6 of UN recommendations for the use of screening procedures to assess oxidising properties the structure of phosphoric acid was assessed for chemical groups that would imply oxidising properties. Examples of such groups are nitrates, metal oxides, hypofluorites, difluoroaminopolynitroaryls, perchlorates, bromates and iodines.

It is concluded that phosphoric acid does not have any functional groups that would imply oxidising properties. Therefore, testing for oxidising properties does not need to be conducted.

Information requirement: Stability in organic solvents and identity of relevant degradation products

Reason: other justification

Justification: In accordance with Annex IX, section 7.15, column 2 of Regulation (EC) No. 1907/2006 (REACH), the stability in organic solvents and identity of relevant degradation products does not need to be assessed for inorganic chemicals. Phosphoric acid is an inorganic chemical and therefore a study on the stability in organic solvents does not need to be conducted.

Information requirement: Viscosity

Reason: study scientifically unjustified

Justification: In accordance with Annex XI, Section 2: testing is technically not possible of Regulation EC No. 1907/2006 (REACH) a study is not provided for the endpoint 'viscosity'. The relevant OECD guideline (OECD 114) states that a study cannot be conducted on a substance that is a solid at room temperature. A viscosity study is therefore not applicable to pure, solid phosphoric acid.

Nevertheless as phosphoric acid is produced and handled most of the time as a liquid solution, available supporting data are provided.

2. MANUFACTURE AND USES

No information available on quantities

2.1. Manufacture

Table 3. Manufacture

Identifiers	Use descriptors	Other information
M-1: Manufacture of Phosphoric acid. Including manufacture of phosphoric acid as an intermediate	**Environmental release category (ERC):** ERC 1: Manufacture of substances **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent	

No information available on manufacturing process related to the specified manufacture(s)

No information available on production of articles covered by the specified use(s)

2.2. Identified uses

Table 4. Formulation

Identifiers	Use descriptors	Other information
F-1: Formulation of mixtures	**Environmental release category (ERC):** ERC 2: Formulation of preparations **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Substance supplied to that use: As such In a mixture Remarks: ES Short Title for ES communication: Formulation including mixing, handling, repacking; various products; ERC 2

Identifiers	Use descriptors	Other information
	PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category formulated:** PC 1: Adhesives, sealants PC 4: Anti-freeze and de-icing products PC 7: Base metals and alloys PC 8: Biocidal products (e.g. disinfectants, pest control) PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 12: Fertilisers PC 13: Fuels PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 33: Semiconductors PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC 35: Washing and cleaning products (including solvent based products) PC 36: Water softeners PC 37: Water treatment chemicals PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products PC 39: Cosmetics, personal care products PC 0: Other: UCN-Code B 20300, K 35900 PC 27: Plant protection products **Technical function of the substance during formulation:** Component of a mixture Intermediates	
F-2: formulation of mixtures and materials/articles	**Environmental release category (ERC):** ERC 3: Formulation in materials **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with	Substance supplied to that use: As such In a mixture Remarks: ES Short Title for ES communication: Formulation

Identifiers	Use descriptors	Other information
	occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent **Product Category formulated:** PC 1: Adhesives, sealants PC 7: Base metals and alloys PC 8: Biocidal products (e.g. disinfectants, pest control) PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 12: Fertilisers PC 13: Fuels PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 33: Semiconductors PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment chemicals PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products PC 39: Cosmetics, personal care products PC 0: Other: UCN-Code B 20300, K 35900	including mixing, handling, repacking; various products; ERC 3

Identifiers	Use descriptors	Other information
	Technical function of the substance during formulation: Laboratory chemicals pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Degreasing agent Intermediates	

Table 5. Uses at industrial sites

Identifiers	Use descriptors	Other information
IW-1: Synthesis of chemical products (use as intermediate)	**Environmental release category (ERC):** ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals **Technical function of the substance during formulation:** Fertilisers Corrosion inhibitors and anti-scaling agents Intermediates	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various sectors (SU 8, SU 9); ERC 6a
IW-2: Synthesis of chemical products (use as a processing aid)	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks:

Identifiers	Use descriptors	Other information
	PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Intermediates	ES Short Title for ES communication: Use at industrial sites; various sectors (SU 8, SU 9); ERC 6b
IW-3: Use in metal and non-metal surface treatment, not becoming part of an article.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 21: Low energy manipulation of substances	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 7, PC 14, PC 15, PC 21, PC 35); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 4

Identifiers	Use descriptors	Other information
	bound in materials and/or articles PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 25: Other hot work operations with metals PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 7: Base metals and alloys PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 21: Laboratory chemicals PC 35: Washing and cleaning products (including solvent based products) **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** Intermediates pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Plating agents and metal surface treating agents Oxidising agents Degreasing agents, electrolyte	
IW-4: Use in metal and non-metal surface treatment, resulting in inclusion in articles.	**Environmental release category (ERC):** ERC 5: Industrial use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-1: Service life of metal and non-metal articles treated with phosphoric acid Remarks: Use as a protective coating and oxidation inhibitor. ES Short Title for ES communication: Use at industrial sites; various

Identifiers	Use descriptors	Other information
	(charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 16: Using material as fuel sources, limited exposure to unburned product to be expected PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 25: Other hot work operations with metals **Product Category used:** PC 7: Base metals and alloys PC 9a: Coatings and paints, thinners, paint removes PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 24: Lubricants, greases, release products PC 35: Washing and cleaning products (including solvent based products) **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** Intermediates pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Plating agents and metal surface treating agents Oxidising agents Degreasing agent, electrolyte	sectors (SU 14, SU 15, SU 16, SU 17); ERC 5
IW-5: Use in metal and non-metal	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids	Substance supplied to that use: In a mixture

Identifiers	Use descriptors	Other information
surface treatment as a processing aid.	**Process category (PROC):** PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 25: Other hot work operations with metals **Product Category used:** PC 7: Base metals and alloys PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 35: Washing and cleaning products (including solvent based products) **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment	As such Subsequent service life relevant for that use: no Remarks: Use as a protective coating and oxidation inhibitor. ES Short Title for ES communication: Use at industrial sites; various sectors (SU 14, SU 15, SU 16, SU 17); ERC 6b

Identifiers	Use descriptors	Other information
	Technical function of the substance during formulation: Intermediates pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Plating agents and metal surface treating agents Oxidising agents Degreasing agent,electrolyte	
IW-6: Cleaning agent	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 8: Biocidal products (e.g. disinfectants, pest control) PC 35: Washing and cleaning products (including solvent based products) **Sector of end use:** SU 4: Manufacture of food products SU 20: Health services SU 0: Other: NACE Code C10: Manufacture of food products **Technical function of the substance during formulation:**	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 8, PC 35); various sectors (SU 4, SU 20, SU 0: other: NACE Code C10: manufacture of food products); ERC 4

Identifiers	Use descriptors	Other information
	Intermediates Laboratory chemicals pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Degreasing agent	
IW-7: Cleaning agent	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 8: Biocidal products (e.g. disinfectants, pest control) PC 35: Washing and cleaning products (including solvent based products) **Sector of end use:** SU 4: Manufacture of food products SU 20: Health services SU 0: Other: NACE Code C10: Manufacture of food products **Technical function of the substance during formulation:** Intermediates Laboratory chemicals pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 8, PC 35); various sectors (SU 4, SU 20, SU 0: other: NACE Code C10: manufacture of food products); ERC 6b

Identifiers	Use descriptors	Other information
	Degreasing agent	
IW-8: Processing aid in chemical industry and other industries.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Product Category used:** PC 1: Adhesives, sealants PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 13: Fuels PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 33: Semiconductors PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 4

Identifiers	Use descriptors	Other information
	PC 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment chemicals PC 39: Cosmetics, personal care products **Sector of end use:** SU 4: Manufacture of food products SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 11: Manufacture of rubber products SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 19: Building and construction work **Technical function of the substance during formulation:** Intermediates Laboratory chemicals pH-regulating agents Processing aid, not otherwise listed electrolyte	
IW-9: Processing aid in chemical industry and other industries.	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Product Category used:**	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 6b

Identifiers	Use descriptors	Other information
	PC 1: Adhesives, sealants PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 13: Fuels PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC 33: Semiconductors PC 37: Water treatment chemicals PC 39: Cosmetics, personal care products **Sector of end use:** SU 4: Manufacture of food products SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 11: Manufacture of rubber products SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 19: Building and construction work **Technical function of the substance during formulation:** Intermediates Laboratory chemicals pH-regulating agents Processing aid, not otherwise listed electrolyte	
IW-10: Processing aid in chemical industry and other industries, resulting in incorporation in articles.	**Environmental release category (ERC):** ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-5: Service life of plastic articles and resins containing low levels of phosphoric acid. Remarks: ES Short Title for ES communication: Use at industrial sites; various products; various sectors;

Identifiers	Use descriptors	Other information
	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Product Category used:** PC 1: Adhesives, sealants PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 13: Fuels PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 33: Semiconductors PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC 37: Water treatment chemicals PC 39: Cosmetics, personal care products **Sector of end use:** SU 4: Manufacture of food products SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 11: Manufacture of rubber products SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 19: Building and construction work **Technical function of the substance during formulation:** Intermediates Laboratory chemicals pH-regulating agents Processing aid, not otherwise listed electrolyte	ERC 6d

Identifiers	Use descriptors	Other information
IW-11: Processing aid in chemical industry and other industries.	**Environmental release category (ERC):** ERC 7: Industrial use of substances in closed systems **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Product Category used:** PC 1: Adhesives, sealants PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 13: Fuels PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 23: Leather tanning, dye, finishing, impregnation and care products PC 24: Lubricants, greases, release products PC 25: Metal working fluids PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC 32: Polymer preparations and compounds PC 33: Semiconductors PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids PC 37: Water treatment chemicals PC 39: Cosmetics, personal care products	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 7

Identifiers	Use descriptors	Other information
	Sector of end use: SU 4: Manufacture of food products SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals SU 11: Manufacture of rubber products SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 19: Building and construction work **Technical function of the substance during formulation:** Intermediates Laboratory chemicals pH-regulating agents Processing aid, not otherwise listed electrolyte	
IW-12: Use as a phosphate source.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **Product Category used:** PC 0: Other: nutritional source **Sector of end use:** SU 4: Manufacture of food products SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** Food/feedstuff additives	Substance supplied to that use: As such Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; other product – nutritional source (PC 0); various sectors (SU 4, SU 23); ERC 4
IW-13: Use of phosphoric acid as a catalyst	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no

Identifiers	Use descriptors	Other information
	PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 15: Use as laboratory reagent **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 9: Manufacture of fine chemicals **Technical function of the substance during formulation:** catalyst Intermediates	Remarks: ES Short Title for ES communication: Use at industrial sites; various sectors (SU 8, SU 9); ERC 6b
IW-14: Use as a binding agent in ceramic materials and refractory products, resulting in incorporation in articles.	**Environmental release category (ERC):** ERC 5: Industrial use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 7: Industrial spraying PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 0: Other: UCN-Code B 20300, K 35900 (other construction materials) **Sector of end use:** SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 19: Building and construction work **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-2: Service life of construction articles containing phosphoric acid Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900); various sectors (SU 13, SU 19); ERC 5
IW-15: Use as a binding agent in	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids	Substance supplied to that use: In a mixture

Identifiers	Use descriptors	Other information
ceramic materials and in refractory products, not becoming part of articles.	**Process category (PROC):** PROC 7: Industrial spraying PROC 10: Roller application or brushing PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 0: Other: UCN-Code B 20300, K 35900 (other construction materials) **Sector of end use:** SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 19: Building and construction work **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900; various sectors (SU 13, SU 19); ERC 6b
IW-16: Use as an additive, pigment or auxiliary in plastics, resins and paints.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available.	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 4

Identifiers	Use descriptors	Other information
	Product Category used: PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds **Sector of end use:** SU 12: Manufacture of plastics products, including compounding and conversion **Technical function of the substance during formulation:** Processing aid, not otherwise listed	
IW-17: Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles.	**Environmental release category (ERC):** ERC 5: Industrial use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds **Sector of end use:** SU 12: Manufacture of plastics products, including compounding and conversion **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-5: Service life of plastic articles and resins containing low levels of phosphoric acid. Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 5

Identifiers	Use descriptors	Other information
IW-18: Use as an additive, pigment or auxiliary in plastics, resins and paints.	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds **Sector of end use:** SU 12: Manufacture of plastics products, including compounding and conversion **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 6b
IW-19: Use as an additive, pigment or auxiliary in plastics, resins and paints.	**Environmental release category (ERC):** ERC 7: Industrial use of substances in closed systems **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 7

Identifiers	Use descriptors	Other information
	and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds **Sector of end use:** SU 12: Manufacture of plastics products, including compounding and conversion **Technical function of the substance during formulation:** Processing aid, not otherwise listed	
IW-20: Use in water and wastewater treatment.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 6: Calendering operations PROC 7: Industrial spraying PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 26: Handling of solid inorganic substances at ambient temperature **Product Category used:** PC 4: Anti-freeze and de-icing products	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 4

Identifiers	Use descriptors	Other information
	PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** pH-regulating agents Processing aid, not otherwise listed	
IW-21: Use in water and wastewater treatment.	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 6: Calendering operations PROC 7: Industrial spraying PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 26: Handling of solid inorganic substances at ambient temperature **Product Category used:** PC 4: Anti-freeze and de-icing products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** pH-regulating agents Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 6b

Identifiers	Use descriptors	Other information
IW-22: Use in water and wastewater treatment.	**Environmental release category (ERC):** ERC 7: Industrial use of substances in closed systems **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 6: Calendering operations PROC 7: Industrial spraying PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 26: Handling of solid inorganic substances at ambient temperature **Product Category used:** PC 4: Anti-freeze and de-icing products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** pH-regulating agents Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 7
IW-23: Use of lubricants in high energy open processes.	**Environmental release category (ERC):** ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use at industrial sites; lubricants, greases, release products (PC 24); general manufacturing, e.g. machinery, equipment,

Identifiers	Use descriptors	Other information
	PROC 17: Lubrication at high energy conditions and in partly open process **Product Category used:** PC 24: Lubricants, greases, release products **Sector of end use:** SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** Lubricants and lubricant additives	vehicles, other transport equipment (SU 17).
IW-24: Use a phosphate source	**Environmental release category (ERC):** ERC 6b: Industrial use of reactive processing aids **Process category (PROC):** PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **Product Category used:** PC 0: Other: nutritional source **Sector of end use:** SU 4: Manufacture of food products SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** Food/feedstuff additives	Substance supplied to that use: As such Subsequent service life relevant for that use: no Remarks: ES Short title for ES communication: Use at industrial sites; other product - nutritional source (PC 0); various sectors (SU 4. SU 23); ERC 6b

Table 6. Uses by professional workers

Identifiers	Use descriptors	Other information
PW-1: Use of fertilizers containing phosphoric acid	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers;

Identifiers	Use descriptors	Other information
	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 12: Fertilisers **Sector of end use:** SU 1: Agriculture, forestry and fishing **Technical function of the substance during formulation:** Fertilisers	fertilisers (PC 12)
PW-2: Use in metal and non-metal surface treatment	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles **Product Category used:** PC 14: Metal surface treatment products, including galvanic and electroplating products **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8a, ERC 8d

Identifiers	Use descriptors	Other information
	SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Degreasing agent Plating agents and metal surface treating agents	
PW-3: Use in metal and non-metal surface treatment	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles **Product Category used:** PC 14: Metal surface treatment products, including galvanic and electroplating products **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Oxidising agents Degreasing agent	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8b, ERC 8e
PW-4: Use in metal and non-metal	**Environmental release category (ERC):** ERC 8c: Wide dispersive indoor use resulting in	Substance supplied to that use: In a mixture

Identifiers	Use descriptors	Other information
surface treatment.	inclusion into or onto a matrix ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles **Product Category used:** PC 14: Metal surface treatment products, including galvanic and electroplating products **Sector of end use:** SU 14: Manufacture of basic metals, including alloys SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment SU 17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Oxidising agents Degreasing agent, electrolyte	Subsequent service life relevant for that use: yes Link to the subsequent service life: A-4: Service life of metal and non-metal articles treated with phosphoric acid, professional setting Remarks: ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8c, ERC 8f
PW-5: Construction applications	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 21: Low energy manipulation of substances bound in materials and/or articles	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-2: Service life of construction articles containing phosphoric acid Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 9b, PC 15, PC 20); building and

Identifiers	Use descriptors	Other information
	PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 9b: Fillers, putties, plasters, modelling clay PC 15: Non-metal-surface treatment products PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents **Sector of end use:** SU 19: Building and construction work **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed	construction work (SU 19)
PW-6: Detergent and cleaning agent	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 8: Biocidal products (e.g. disinfectants, pest control) PC 31: Polishes and wax blends PC 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment chemicals PC 0: Other: UCN code A20100 Antiscaling agents **Sector of end use:** SU 20: Health services **Technical function of the substance during**	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 8, PC 31, PC 35, PC 37, PC 0, other: UCN code A20100 antiscaling agents); ERC 8a, ERC 8d

Identifiers	Use descriptors	Other information
	formulation: Corrosion inhibitors and anti-scaling agents pH-regulating agents Processing aid, not otherwise listed Degreasing agent	
PW-7: Detergent and cleaning agent	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 8: Biocidal products (e.g. disinfectants, pest control) PC 31: Polishes and wax blends PC 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment chemicals PC 0: Other: UCN code A20100 Antiscaling agents **Sector of end use:** SU 20: Health services **Technical function of the substance during formulation:** Corrosion inhibitors and anti-scaling agents pH-regulating agents Processing aid, not otherwise listed Degreasing agent	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 8, PC 31, PC 35, PC 37, PC 0, other: UCN code A20100 antiscaling agents); ERC 8b, ERC 8e
PW-8: Soldering aid	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):**	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks:

Identifiers	Use descriptors	Other information
	PROC 25: Other hot work operations with metals **Product Category used:** PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products **Sector of end use:** SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 16: Manufacture of computer, electronic and optical products, electrical equipment **Technical function of the substance during formulation:** Processing aid, not otherwise listed Flux agents for soldering	ES Short Title for ES communication: Use by professional workers; Welding and soldering products (PC 38); ERC 8b, ERC 8e
PW-9: Professional use of substance as a laboratory/research chemical	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems **Process category (PROC):** PROC 15: Use as laboratory reagent **Product Category used:** PC 21: Laboratory chemicals **Sector of end use:** SU 24: Scientific research and development **Technical function of the substance during formulation:** Intermediates Laboratory chemicals	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; Laboratory chemicals (PC 21); ERC 8b
PW-10: Professional formulation (e.g. dilution, mixing, packing, cleaning equipment, etc)	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent PROC 19: Hand-mixing with intimate contact and only PPE available.	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 12, PC 14, PC 20, PC 35, PC 38); various sectors (SU 1, SU 10), ERC 8a, ERC 8d

Identifiers	Use descriptors	Other information
	Product Category used: PC 12: Fertilisers PC 14: Metal surface treatment products, including galvanic and electroplating products PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 35: Washing and cleaning products (including solvent based products) PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products **Sector of end use:** SU 1: Agriculture, forestry and fishing SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) **Technical function of the substance during formulation:** Laboratory chemicals component of a mixture	
PW-11: Use as an additive, pigment or auxiliary in plastics, resins and paints.	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8a, ERC 8d

Identifiers	Use descriptors	Other information
	PC 0: Other: flame retardant agent **Sector of end use:** SU 6a: Manufacture of wood and wood products SU 12: Manufacture of plastics products, including compounding and conversion SU 0: Other: Fire service activities (NACE 84.25) **Technical function of the substance during formulation:** Processing aid, not otherwise listed	
PW-12: Use as an additive, pigment or auxiliary in plastics, resins and paints.	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds PC 0: Other: flame retardant agent **Sector of end use:** SU 0: Other: Fire service activities (NACE 84.25) SU 6a: Manufacture of wood and wood products SU 12: Manufacture of plastics products, including compounding and conversion **Technical function of the substance during formulation:**	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8b, ERC 8e

Identifiers	Use descriptors	Other information
	Processing aid, not otherwise listed	
PW-13: Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles.	**Environmental release category (ERC):** ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 9a: Coatings and paints, thinners, paint removes PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 32: Polymer preparations and compounds PC 0: Other: flame retardant agent **Sector of end use:** SU 6a: Manufacture of wood and wood products SU 12: Manufacture of plastics products, including compounding and conversion SU 0: Other: Fire service activities (NACE 84.25) **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-5: Service life of plastic articles and resins containing low levels of phosphoric acid. Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8c, ERC 8f
PW-14: Use in water and wastewater treatment	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 2: Use in closed, continuous process with	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES

Identifiers	Use descriptors	Other information
	occasional controlled exposure PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 11: Non industrial spraying PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting **Product Category used:** PC 4: Anti-freeze and de-icing products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** pH-regulating agents Processing aid, not otherwise listed	communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 8a, ERC 8d
PW-15: Use in water and wastewater treatment	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 11: Non industrial spraying PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 8b, ERC 8e

Identifiers	Use descriptors	Other information
	with minerals/metals at elevated temperature. Industrial setting **Product Category used:** PC 4: Anti-freeze and de-icing products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment **Technical function of the substance during formulation:** pH-regulating agents Processing aid, not otherwise listed	
PW-16: Use in water and wastewater treatment	**Environmental release category (ERC):** ERC 9a: Wide dispersive indoor use of substances in closed systems ERC 9b: Wide dispersive outdoor use of substances in closed systems **Process category (PROC):** PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 6: Calendering operations PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 11: Non industrial spraying PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting **Product Category used:** PC 4: Anti-freeze and de-icing products PC 16: Heat transfer fluids PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 36: Water softeners PC 37: Water treatment chemicals **Sector of end use:** SU 23: Electricity, steam, gas water supply and sewage treatment	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 9a, 9b

Identifiers	Use descriptors	Other information
	Technical function of the substance during formulation: pH-regulating agents Processing aid, not otherwise listed	
PW-17: Use as a binding agent in ceramic materials and in refractory products	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Process category (PROC):** PROC 10: Roller application or brushing PROC 11: Non industrial spraying PROC 13: Treatment of articles by dipping and pouring PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 19: Hand-mixing with intimate contact and only PPE available. **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 0: Other: UCN-Code B 20300, K 35900 (other construction materials) **Sector of end use:** SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 19: Building and construction work **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; various products (PC 20, PC 0: other: UCN-Code B 20300, K 35900); various sectors (SU 13, SU 19); ERC 8b, ERC 8e
PW-18: Use in PPE cartridges	**Environmental release category (ERC):** ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix **Process category (PROC):** PROC 3: Use in closed batch process (synthesis or formulation) PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **Product Category used:** PC 2: Adsorbents **Sector of end use:** SU 1: Agriculture, forestry and fishing SU 2a: Mining (without offshore industries) SU 5: Manufacture of textiles, leather, fur SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: A-3: Use of PPE cartridge Remarks: ES Short Title for ES communication: Use by professional workers; adsorbents (PC 2); ERC 8c

Identifiers	Use descriptors	Other information
	SU 9: Manufacture of fine chemicals SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU 11: Manufacture of rubber products SU 12: Manufacture of plastics products, including compounding and conversion SU 13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 15: Manufacture of fabricated metal products, except machinery and equipment SU 18: Manufacture of furniture **Technical function of the substance during formulation:** Agents adsorbing and absorbing gases or liquids Surface active agents	
PW-19: Professional use in orthodontic and dental products.	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems **Process category (PROC):** PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 0: Other: Other process or activity: mixing and/or application of dental orthodontic materials **Product Category used:** PC 0: Other: Other products – medical devices **Sector of end use:** SU 20: Health services **Technical function of the substance during formulation:** pH-regulating agents etchant	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; other products – medical devices (PC 0), health Services (SU 20); ERC 8b
PW-20: Use in plant protection products (under Regulation 1107/2009)	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Process category (PROC):** PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 11: Non industrial spraying **Product Category used:** PC 27: Plant protection products **Sector of end use:**	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Use by professional workers; plant protection products (PC 27), Agriculture, forestry and fishing (SU 1); ERC 8a, ERC 8d

Identifiers	Use descriptors	Other information
	SU 1: Agriculture, forestry and fishing **Technical function of the substance during formulation:** Co-formulant of a Plant protection product covered under Regulation 1107/2009 pH-regulating agents	

Table 7. Consumer uses

Identifiers	Use descriptors	Other information
C-1: Consumer use of polishes and waxes	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Product Category used:** PC 31: Polishes and wax blends **Technical function of the substance during formulation:** Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Degreasing agent	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use; polishes and wax blends (PC 31); ERC 8a, ERC 8d
C-2: Consumer use of washing and cleaning products	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Product Category used:** PC 35: Washing and cleaning products (including solvent based products) **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents Processing aid, not otherwise listed Degreasing agent	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use; washing and cleaning products (including solvent based products) (PC 35); ERC 8a, ERC 8d
C-3: Consumer use of washing and cleaning products	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Product Category used:** PC 35: Washing and cleaning products (including solvent based products) **Technical function of the substance during formulation:** pH-regulating agents Corrosion inhibitors and anti-scaling agents	Substance supplied to that use: As such In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use; washing and cleaning products (including solvent based products) (PC 35); ERC 8b, ERC 8e

Identifiers	Use descriptors	Other information
	Processing aid, not otherwise listed Degreasing agent	
C-4: consumer use of soldering aids	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Product Category used:** PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products **Technical function of the substance during formulation:** pH-regulating agents Oxidising agents metal surface treatment agent, flux agent during soldering	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use; welding and soldering products (with flux coatings or flux cores), flux products (PC 38); ERC 8b, ERC 8e
C-5: Use of fertilizers containing phosphoric acid	**Environmental release category (ERC):** ERC 8e: Wide dispersive outdoor use of reactive substances in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems **Product Category used:** PC 12: Fertilisers **Technical function of the substance during formulation:** Fertilisers	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use: fertilisers (PC 12)
C-6: Consumer use as a binding agent in ceramic materials and in refractory products	**Environmental release category (ERC):** ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 0: Other: UCN-Code B 20300, K 35900 **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Substance supplied to that use: In a mixture Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use: various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900); ERC 8b, ERC 8e
C-7: Use in plant protection products (under Regulation 1107/2009)	**Environmental release category (ERC):** ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems **Product Category used:** PC 27: Plant protection products **Technical function of the substance during**	Substance supplied to that use: As such Subsequent service life relevant for that use: no Remarks: ES Short Title for ES communication: Consumer use: plant protection products

Identifiers	Use descriptors	Other information
	formulation: Co-formulant of a Plant protection product covered under Regulation 1107/2009 pH-regulating agents	(PC 27), Agriculture, forestry and fishing (SU 1); ERC 8a, ERC 8d

Table 8. Article service life

Identifiers	Use descriptors	Other information
SL-1: Service life of metal and non-metal articles treated with phosphoric acid	**Article category related to subsequent service life (AC):** AC 2: Machinery, mechanical appliances, electrical/electronic articles AC 7: Metal articles **Exposure related description of article:** Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling **Environmental release category (ERC):** ERC 12a: Industrial processing of articles with abrasive techniques (low release) ERC 12b: Industrial processing of articles with abrasive techniques (high release) **Process category (PROC):** PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles **Technical function of the substance during formulation:** Corrosion inhibitors and anti-scaling agents	Article used by: workers Remarks: ES Short Title for ES communication: Service life (worker), various articles (AC 2, AC 7); ERC 12a, ERC 12b
SL-2: Service life of construction articles containing phosphoric acid	**Article category related to subsequent service life (AC):** AC 4: Stone, plaster, cement, glass and ceramic articles **Exposure related description of article:** Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling **Environmental release category (ERC):** ERC 10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC 11a: Wide dispersive indoor use of long-life articles and materials with low release	Article used by: workers Remarks: ES Short Title for ES communication: Service life (worker), stone, plaster, cement, glass and ceramic articles (AC 4); ERC 10a, ERC 11a

Identifiers	Use descriptors	Other information
	Process category (PROC): PROC 21: Low energy manipulation of substances bound in materials and/or articles PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature **Technical function of the substance during formulation:** Corrosion inhibitors and anti-scaling agents	
SL-3: Use of PPE cartridge	**Article category related to subsequent service life (AC):** AC 01: Other (non intended to be released): PPE cartridge **Exposure related description of article:** Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling **Environmental release category (ERC):** ERC 10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC 11a: Wide dispersive indoor use of long-life articles and materials with low release **Process category (PROC):** PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation **Technical function of the substance during formulation:** Agents adsorbing and absorbing gases or liquids Surface active agents	Article used by: workers consumers Remarks: ES Short Title for ES communication: Service life (worker and consumer), other (non-intended to be released): PPE Cartridge (AC 01); ERC 10a, ERC 11a
SL-4: Service life of metal and non-metal articles treated with phosphoric acid, professional setting	**Article category related to subsequent service life (AC):** AC 2: Machinery, mechanical appliances, electrical/electronic articles AC 7: Metal articles **Exposure related description of article:** Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling **Environmental release category (ERC):** ERC 10a: Wide dispersive outdoor use of long-life articles and materials with low release ERC 11a: Wide dispersive indoor use of long-life articles and materials with low release **Process category (PROC):** PROC 21: Low energy manipulation of substances	Article used by: workers Remarks: ES Short Title for ES communication: Service life (worker), various articles (AC 2, AC 7), ERC 10a, ERC 11a

Identifiers	Use descriptors	Other information
	bound in materials and/or articles PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature PROC 24: High (mechanical) energy work-up of substances bound in materials and/or articles **Technical function of the substance during formulation:** Corrosion inhibitors and anti-scaling agents	
SL-5: Service life of plastic articles and resins containing low levels of phosphoric acid.	**Article category related to subsequent service life (AC):** AC 13: Plastic articles **Environmental release category (ERC):** ERC 11a: Wide dispersive indoor use of long-life articles and materials with low release **Process category (PROC):** PROC 21: Low energy manipulation of substances bound in materials and/or articles **Technical function of the substance during formulation:** Processing aid, not otherwise listed	Article used by: workers consumers Remarks: ES Short Title for ES communication: Service life (worker and consumer), plastic articles (AC 13); ERC 11a

2.3. Uses advised against

No information available

3. CLASSIFICATION AND LABELLING

3.1. Classification and labelling according to CLP / GHS

Name: orthophosphoric acid

Implementation: EU

State/form of the substance: solid / aqueous solution

Remarks: Phosphoric acid is currently listed in Annex VI of Regulation (EC) No. 1272/2008 (Index number: 015-011-00-6) and classified as:
• For physical - chemical properties: Not classified
• For health effects: Skin Corr. 1B, H314 Causes severe skin burns
• For the environment: Not classified
In accordance with Regulation (EC) No. 1272/2008 (EU CLP), a proposal is made for phosphoric acid to be classified as corrosive to metals (H290) at concentrations > 20%.
Phosphoric acid is produced as an aqueous solution and used mostly in this form. Solid form can be produced by crystallization of the aqueous solution.

Classification

The substance is classified as follows:

Table 9. Classification and labelling according to CLP / GHS for physicochemical properties

Hazard class	Hazard category	Hazard statement	Reason for no classification	CSR section*)
Explosives:			conclusive but not sufficient for classification	6.1
Flammable gases and chemically unstable gases:			conclusive but not sufficient for classification	6.2
Aerosols:			conclusive but not sufficient for classification	6.2
Oxidising gases:			conclusive but not sufficient for classification	6.3
Gases under pressure:			conclusive but not sufficient for classification	
Flammable liquids:			conclusive but not sufficient for classification	6.2
Flammable solids:			conclusive but not sufficient for classification	6.2
Self-reactive substances and mixtures:			conclusive but not sufficient for classification	
Pyrophoric liquids:			conclusive but not sufficient for classification	6.2
Pyrophoric solids:			conclusive but not sufficient for classification	6.2
Self-heating substances and mixtures:			conclusive but not sufficient for classification	
Substances and mixtures which in contact with water emit flammable gases:			conclusive but not sufficient for classification	6.2
Oxidising liquids:			conclusive but not sufficient for classification	6.3
Oxidising solids:			conclusive but not sufficient for classification	6.3
Organic peroxides:			conclusive but not sufficient for classification	
Corrosive to metals:	Met. Corr. 1	H290: May be corrosive to metals.		

*) Justification for (non) classification can be found in the CSR section indicated

Table 10. Classification and labelling according to CLP / GHS for health hazards

Hazard class	Hazard category	Hazard statement	Reason for no classification	CSR section*)
Acute toxicity - oral:	Acute Tox. 4	H302: Harmful if swallowed.		5.2.3
Acute toxicity - dermal:			conclusive but not sufficient for classification	5.2.3
Acute toxicity - inhalation:			conclusive but not sufficient for classification	5.2.3
Skin corrosion / irritation:	Skin Corr. 1B	H314: Causes severe skin burns and eye damage.		5.3.4 and 5.4.3
Serious damage / eye irritation:			conclusive but not sufficient for classification	5.3.4
Respiratory sensitisation:			conclusive but not sufficient for classification	5.5.3
Skin sensitation:			conclusive but not sufficient for classification	5.5.3
Aspiration hazard:			conclusive but not sufficient for classification	5.2.3
Reproductive Toxicity:			conclusive but not sufficient for classification	5.9.3
Reproductive Toxicity: Effects on or via lactation:			conclusive but not sufficient for classification	5.9.3
Germ cell mutagenicity:			conclusive but not sufficient for classification	5.7.3
Carcinogenicity:			data lacking	5.8.3
Specific target organ toxicity - single exposure:			conclusive but not sufficient for classification	5.2.3 and 5.3.4
Specific target organ toxicity - repeated exposure:			conclusive but not sufficient for classification	5.6.3

*) Justification for (non) classification can be found in the CSR section indicated

Specific concentration limits:

Concentration (%)	Classification
>= 25.0	Skin Corr. 1B
>= 10.0 — < 25.0	Skin Irrit. 2 Eye Irrit. 2

Table 11. Classification and labelling according to CLP / GHS for environmental hazards

Hazard class	Hazard category	Hazard statement	Reason for no classification	CSR section*)
Hazards to the aquatic environment (acute/short-term):			conclusive but not sufficient for classification	7.6
Hazards to the aquatic environment (chronic/long-term):			conclusive but not sufficient for classification	7.6
Hazardous to the ozone layer:			conclusive but not sufficient for classification	7.6

*) Justification for (non) classification can be found in the CSR section indicated

Labelling

Signal word: Danger

Hazard pictogram:

GHS05: corrosion

GHS07: exclamation mark

Hazard statements:

H290: May be corrosive to metals.
H302: Harmful if swallowed.
H314: Causes severe skin burns and eye damage.

Precautionary statements:

P234: Keep only in original container.
P390: Absorb spillage to prevent material damage.
P406: Store in corrosive resistant/... container with a resistant inner liner.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P264: Wash... thoroughly after handling.
P270: Do no eat, drink or smoke when using this product.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312: IF SWALLOWED: Call a POISON CENTER/doctor/…/if you feel unwell.
P301+P330+P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P330: Rinse mouth.

P363: Wash contaminated clothing before reuse.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310: Immediately call a POISON CENTER/doctor/…
P321: Specific treatment (see... on this label).
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405: Store locked up.
P501: Dispose of contents/container to...

Notes:

Note B

3.2. Classification and labelling according to DSD / DPD

3.2.1. Classification and labelling according to the criteria in Directive 67/548/EEC (DSD) and Directive 1999/45/EC (DPD)

Chemical name: orthophosphoric acid

Remarks: Phosphoric acid is produced as an aqueous solution and used mostly in this form. Solid form can be produced by crystallization of the aqueous solution.

Classification

The substance is classified as follows:

Table 12. Classification and labelling for physicochemical properties

Category of danger	Classification	Reason for no classification	CSR section*)
Explosive:		conclusive but not sufficient for classification	6.1
Oxidising:		conclusive but not sufficient for classification	6.2
Flammable:		conclusive but not sufficient for classification	6.3

*) Justification for (non) classification can be found in the CSR section indicated

Table 13. Classification and labelling for health hazards

Category of danger	Classification	Reason for no classification	CSR section*)
Acute toxicity:		conclusive but not sufficient for classification	5.2.3
Acute toxicity - irreversible damage after single exposure:		conclusive but not sufficient for classification	5.2.3
Repeated dose toxicity:		conclusive but not sufficient for classification	5.6.3
Corrosive / Irritant:	C; R34 Causes burns.		5.3.4 and 5.4.3

Sensitisation:		conclusive but not sufficient for classification	5.5.3
Carcinogenicity:		data lacking	5.8.3
Mutagenicity - Genetic Toxicity:		conclusive but not sufficient for classification	5.7.3
Toxicity to reproduction - fertility:		conclusive but not sufficient for classification	5.9.3
Toxicity to reproduction - development:		conclusive but not sufficient for classification	5.9.3
Toxicity to reproduction - breastfed babies:		conclusive but not sufficient for classification	5.9.3

*) Justification for (non) classification can be found in the CSR section indicated

Table 14. Classification and labelling for the environment

Category of danger	Classification	Reason for no classification	CSR section*)
Environment:		conclusive but not sufficient for classification	7.6

*) Justification for (non) classification can be found in the CSR section indicated

Labelling

Indication of danger:

C - corrosive

R-phrases:

R34 - Causes burns

S-phrases:

S1/2 - keep locked up and out of reach of children
S26 - in case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

Specific concentration limits:

Concentration (%)	Classification
ca. 25.0	C; R34 Causes burns.
>= 10.0 — < 25.0	Xi; R36/38 Irritating to eyes and skin.

Notes:

Note B

3.2.2. Self classification(s)

No relevant information available

3.2.3. Other classification(s)

No relevant information available

4. ENVIRONMENTAL FATE PROPERTIES

General discussion of environmental fate and pathways:

In accordance with Annex VII to XI of Regulation (EC) No. 1907/2006 (REACH) the environmental fate endpoints for phosphoric acid are waived on the following grounds.

Phosphoric acid is an inorganic substance and as such the following studies are not applicable and cannot be performed:

- OECD 106; Adsorption - Desorption Using a Batch Equilibrium Method

- OECD 309: Aerobic Mineralisation in Surface Water – Simulation Biodegradation Test

- OECD 310: Ready Biodegradability - CO2 in sealed vessels (Headspace Test)

Furthermore, environmental fate (Q)SAR applications are not validated for inorganics and therefore cannot be used in place of test data.

Despite the lack of test data the following is known about the environmental behaviour of phosphoric acid. Phosphoric acid is highly soluble in water and as a consequence will be dissociated into its ions ($H^+$and mainly $H_2PO_4^-$and HPO_4^{2-}) at pH 3, 7 and 10. In water the H^+ions will form H_3O^+ions. The hydrolysis endpoint can thus be waived.

The Guidance on information requirements and chemical safety assessment Chapter R.7c Appendix R.7.10-1, states that a substance is unlikely to pose a risk to predatory organisms or humans if “it is an essential element and internal concentrations will be well-regulated at the exposure concentrations anticipated”. In biological systems phosphoric acid exists as phosphate and hydrogen ions. Phosphate levels in the body are regulated via homeostasis and therefore phosphoric acid is not considered to be bioaccumulative. Therefore, bioaccumulation is not a relevant endpoint for phosphoric acid.

According to Annex IX-X, Section 9.2, Column 2 of Regulation (EC) No. 1907/2006 (REACH) “Further biotic degradation testing shall be proposed by the registrant if the chemical safety assessment according to Annex I indicated the need to investigate further the degradation of the substance and its degradation products”.

Adequate information on the degradation of phosphoric acid is available and the degradation products are clearly identified. The chemical safety assessment does not indicate the need for further testing and therefore no further testing for environmental fate is proposed.

Eutrophication

Phosphoric acid rapidly dissociates to soluble inorganic orthophosphate in wastewater, sewerage systems and natural waters. Sources of inorganic phosphate are human urine and faeces, animal waste, food and organic waste, mineral fertilisers, bacterial recycling of organic materials in ecosystems, etc. Soluble phosphates are then bio-assimilated by the bacterial populations and the aquatic plants and algae found in these different compartments. Phosphates are an essential nutrient (food element) for plants, and stimulate the growth of water plants (macrophytes) and/or algae (phytoplankton) if they represent the growth-limiting factor.

Nutrient enrichment caused by excess of phosphate (when the conditions are such that P is a growth-limiting factor) can be a problem in some circumstances. The effects of eutrophication can range from ecosystem modifications, through to algal blooms and in extreme cases (through decomposition of plant biomass) oxygen depletion and collapse of the ecological community in a surface water causing considerable detrimental impacts on fish and other organisms as the increase in primary production leads to increased oxygen consumption, which may reduce the oxygen concentration to critical low levels.

To avoid such undesirable effects, phosphate emissions to surface water via industrial wastewater are regulated in the Council Directive 96/61/EC concerning integrated pollution prevention and control. It states that phosphates have to be taken into account for fixing emission limit values for industrial wastewater. In order to meet the requirements it may be necessary to add a treatment step for phosphate removal from industrial wastewaters before these waters are released to the aqueous environment. This method for limiting the concentration of phosphates in industrial wastewater emissions is supported by theUrban Waste Water

Treatment Directive 1991/271 (EU) which requires the removal of phosphate (P) from municipal waste water in all but very small conurbations (> 10 000 person equivalents = around 6 000 population taking into account small industry and commerce inputs), wherever discharge occurs into waters potentially susceptible to eutrophication. The EU Water Framework Directive 2000/60 confirms this obligation, and reinforces it by requiring further treatment, e. g. of small conurbations, if this is necessary to achieve water quality status objectives.

De Madariaga BM (2007) developed a conceptual model and protocol for performing European quantitative eutrophication risk assessments of (poly) phosphates in detergents. In this model, the risk probability for eutrophication occurring in the most sensitive areas of a river basin (lakes, reservoirs, meadow zones, estuaries), is based on the TP (total phosphorous) concentration of the inflow water. The variability observed for similar TP concentrations is the consequence of variations in concentrations of N and/or other nutrients, other ecosystem factors and other natural variability. The study also covered the implementation of the model and a set of examples based on generic European scenarios as well as a pan European probabilistic estimation covering the diversity observed for the European conditions and enabled a probabilistic risk assessment of eutrophication relating to the use of sodium tripolyphosphate (pentasodium triphosphate) in detergents. The scientific validity of this methodology was confirmed by the EU scientific committee SCHER (Opinion of 29th November 2007).

4.1. Degradation

4.1.1. Abiotic degradation

4.1.1.1. Hydrolysis

Data waiving

Information requirement: Hydrolysis

Reason: study scientifically unjustified

Justification: In accordance with the introductory text of Annex VII-X of Regulation (EC) No. 1907/2006 (REACH), when, for certain endpoints, information is not provided for reasons other than those stated in column 2 of the respective Annex or in Annex XI, this fact and the reasons shall be clearly stated.

There are no experimental data available for the hydrolysis of phosphoric acid. It is commonly known that water hydrolyses phosphoric acid into its conjugated bases plus hydronium (H3O+) ions. This reaction is also called dissociation in the context of acid-base reactions. The conjugated bases include H2PO4(-), HPO4(2-) and PO4(3-), so phosphoric acid can dissociate three times. For each dissociation reaction there is an acid dissociation constant. For a given total acid concentration (i. e. sum of phosphoric acid and its three conjugated bases), the composition of an aqueous solution of phosphoric acid can be calculated. For large acid concentrations (pH<2), the aqueous solution is mainly composed of H3PO4. A total acid concentration of 0.01 M (pH 2.25) gives an equimolar mixture of H3PO4 and H2PO4(-), and a concentration below 0.001 M (pH>3) gives a solution mainly composed of H2PO4(-). At very dilute solutions (<0.00001 M or pH>5) both H2PO4(-) and HPO4(2-) are present. The PO4(3-) concentrations are always negligible.

4.1.1.2. Phototransformation/photolysis

4.1.1.2.1. Phototransformation in air

No relevant information available

4.1.1.2.2. Phototransformation in water

No relevant information available

4.1.1.2.3. Phototransformation in soil

No relevant information available

4.1.2. Biodegradation

4.1.2.1. Biodegradation in water

4.1.2.1.1. Screening tests

Data waiving

Information requirement: Biodegradation in water: screening test

Reason: study scientifically unjustified

Justification: In accordance with Annex VII, section 9.2.1.1, column 2 of Regulation (EC) No. 1907/2008 (REACH) a study for ready biodegradability does not need to be conducted if the substance is inorganic. Phosphoric acid is an inorganic acid and as such no study has been performed.

4.1.2.1.2. Simulation tests (water and sediments)

Data waiving

Information requirement: Simulation testing for biodegradation in water and sediment

Reason: study scientifically unjustified

Justification: According to Annex IX-X, Section 9.2, Column 2 of Regulation (EC) No. 1907/2006 (REACH) “Further biotic degradation testing shall be proposed by the registrant if the chemical safety assessment according to Annex I indicated the need to investigate further the degradation of the substance and its degradation products”.

Adequate information on the degradation of phosphoric acid is available and the degradation products are clearly identified. The chemical safety assessment does not indicate the need for further testing and therefore no further testing for this endpoint is proposed.

4.1.2.1.3. Summary and discussion of biodegradation in water and sediment

4.1.2.2. Biodegradation in soil

Data waiving

Information requirement: Soil simulation testing

Reason: study scientifically unjustified

Justification: According to Annex IX-X, Section 9.2, Column 2 of Regulation (EC) No. 1907/2006 (REACH) “Further biotic degradation testing shall be proposed by the registrant if the chemical safety assessment according to Annex I indicated the need to investigate further the degradation of the substance and its degradation products”.

Adequate information on the degradation of phosphoric acid is available and the degradation products are clearly identified. The chemical safety assessment does not indicate the need for further testing and therefore no further testing for this endpoint is proposed.

4.1.3. Summary and discussion of degradation

4.2. Environmental distribution

4.2.1. Adsorption/desorption

Data waiving

Information requirement: Adsorption/desorption

Reason: study scientifically unjustified

Justification: According to Annex XI, Section 2 of Regulation (EC) No 1907/2006 (REACH) testing for a specific endpoint may be omitted if it is technically not possible to conduct the study as a consequence of the properties of the substance itself. A study to investigate the adsorption / desorption characteristics of

phosphoric acid has not been conducted. The justifications for not providing these data are as follows:

- A screening study according to OECD Guideline 121, is not technically possible as the test method is not validated for inorganic substances.

- A batch equilibrium study according to OECD Guideline 106 was deemed to be not applicable to phosphoric acid for the following reasons:

Firstly, analysis of the test material may not be possible due to interference from the soil extracts that may leach into the aqueous media during the test. This would prevent quantification of the test material.

In addition, the mobility of the test item would be dependent on the anion exchange capacity of the soils as the main component of the test material is an anion. This absorption relationship would not be anticipated to correlate with the organic carbon content of the soils and is considered to be beyond the scope of the OECD 106 method.

4.2.2. Volatilisation

No relevant information available

4.2.3. Distribution modelling

No relevant information available

4.2.4. Summary and discussion of environmental distribution

4.3. Bioaccumulation

4.3.1. Aquatic bioaccumulation

Data waiving

Information requirement: Aquatic bioaccumulation

Reason: study scientifically unjustified

Justification: According to Annex IX, Section 9.3.2, Column 2 of Regulation (EC) No. 1907/2006 (REACH), the study need not be conducted if: the substance has a low potential for bioaccumulation (for instance a log Kow≤3). The Kow has not been determined for phosphoric acid as it is an inorganic substance and the octanol-water partitioning co-efficient is not relevant for inorganic chemicals.

The Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.7c Appendix R.7.10-1, states that a substance is unlikely to pose a risk to predatory organisms or humans if “it is an essential element and internal concentrations will be well-regulated at the exposure concentrations anticipated”. In biological systems phosphoric acid exists as phosphate and hydrogen ions. Phosphate levels in the body are regulated via homeostasis and therefore phosphoric acid is not considered to be bioaccumulative. Testing is not considered to be necessary.

4.3.2. Terrestrial bioaccumulation

No relevant information available

4.3.3. Summary and discussion of bioaccumulation

4.4. Secondary poisoning

Based on the available information, there is no indication of a bioaccumulation potential and, hence, secondary poisoning is not considered relevant (see CSR chapter 7.6 "PNEC derivation and other hazard conclusions").

5. HUMAN HEALTH HAZARD ASSESSMENT

5.1. Toxicokinetics (absorption, metabolism, distribution and elimination)

5.1.1. Non-human information

The results of studies on absorption, metabolism, distribution and elimination are summarised in the following table:

Table 15. Studies on absorption, metabolism, distribution and elimination

Method	Results	Remarks	Reference
rat (Mus norvegicus) male/female oral: feed Exposure regime: Experiment 1: 6 weeks of basal diet, 8 weeks basal diet + acid + 6 weeks basal diet Experiment 2: without control period; all animals had received the diet during 8 months previous to this metabolism experiment, enabling us to compare the metabolism of animals who had received the diets already during a considerable part of their life time (5 weeks of comparison). Doses/conc.: Experiment 1: 0.40% Experiment 2: 0.40% Two metabolism experiments were carried out. Calcium and phosphorus balances, the urinary excretion of ammonia, urea, total base and volume, pH and titratable acidity of the urine were determined. Experiments with radioactive phosphorus were perfomed as well: endogenous fecal phosporus excretion and phosphorus retention of the bone	Metabolites identified: not measured Details on metabolites: No details provided in the dissertation	2 (reliable with restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bonting SL (1952a)

Method	Results	Remarks	Reference
were determined.			
rat (albino rat) male/female oral: feed Doses/conc.: 0.40% Two metabolism experiments were carried out. Calcium and phosphorus balances, the urinary excretion of ammonia, urea, total base and volume, pH and titratable acidity of the urine were determined. In addition, experiments with radioactive phosphorus were performed.		2 (reliable with restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bonting SL (1956)

5.1.2. Human information

No relevant information available

5.1.3. Summary and discussion of toxicokinetics

ABSORPTION

Oral absorption:

The dissociation constants for phosphoric acid have been determined to be pKa1 = 2.1, pKa2 = 7.2 and pKa3 = 12.3. As such, the predominant forms in biological systems will be H2PO4(-) and HPO4(2-).

These anions are present and can be absorbed in the human intestine; which has a pH in the range of 5 to 8 depending upon location. The absorption of ionised acids is favoured at pHs below the PKa and as such phosphoric acid is mainly absorbed in the jejunum (pH6-7) by passive diffusion or active transport facilitated by vitamin D (EFSA, 2005).

The main mechanism for absorption of small water soluble molecules in the GI tract is passage through aqueous pores or carriage of such molecules across membranes with the bulk passage of water. Oral absorption might thus be as high as 100% if the inorganic phosphate intake is low, but will decrease with higher loads. Dietary compounds are also expected to influence the rate and extend of phosphate absorption via the GI tract. The principle dietary factor influencing phosphate uptake from the lumen of the GI tract is intestinal calcium concentration, which can reduce phosphate bioavailability by forming insoluble complexe (Heaney, 2012). For the purposes of REACH, an oral absorption of 100% is therefore proposed.

Respiratory absorption:

Although phosphoric acid is a solid at room temperature, the substance is hygroscopic and no airborne particles are to be expected. Although in general, hydrophilic substances are effectively removed from the air in the upper respiratory tract, the relevance of this mechanism for phosphoric acid is difficult to predict as the octanol/water partition coefficient is not defined for inorganic substances. Hydrophilic substances also have the tendency to be retained in the aqueous fluids (mucus) lining of the respiratory tract, limiting the systemic uptake. Although based on available physico/chemical data the systemic uptake of phosphoric acid might be limited, a worst-case

absorption factor of 100% is proposed for inhalation.

Dermal absorption:

Absorption via the dermal route is expected to be significant as the substance has a low molecular weight and is very water soluble. It may however be too hydrophilic to cross the lipid rich environment of the stratum corneum, but due to the absence of the octanol/water partition coefficient, this is difficult to predict. As phosphoric acid is corrosive to skin, any skin damage might enhance penetration of the substance. It is generally accepted that the dermal absorption will not be higher compared to the oral absorption. As a default value of 100% skin absorption should be used for substances with molecular mass below 500, the dermal absorption factor is set at 100% as for the oral absorption.

DISTRIBUTION

Wide distribution throughout the body is to be expected as small water-soluble molecules and ions will diffuse through aqueous channels and pores. Depending on the structure in which the phosphate is covered, the uptake by cells might either be via active or passive transport. Serum phosphate levels are tightly regulated via homeostatic mechanisms involving the vitamin D endocrine system and parathyroid hormone (PTH). Accumulation of test material in body fat is not favourable.

METABOLISM

The very high water solubility of the test material does suggest it is unlikely to be any metabolism.

EXCRETION

Excretion will be via urine as characteristics favourable for urinary excretion are low molecular weight (below 300 in the rat), good water solubility, and ionisation of the molecule at the pH of urine.

Phosphoric acid as inorganic phosphate is an essential constituent of the human organism, not only in the bones and teeth, but also in many enzyme systems. Phosphorus plays an important role in carbohydrate, fat and protein metabolism.

The following information is taken into account for any hazard / risk assessment:

No studies are available.

A limited toxicokinetic assessment based on available physico/chemical properties of phosphoric acid indicates oral and dermal absorption factors of 50 to 100% and an inhalation absorption factor of 100%. Phosphoric acid is furthermore not considered to have bioaccumulative potential. This qualitative judgement on the toxicokinetic behaviour based on physico-chemical characteristics follows the recommendations of ECHA (ECHA Endpoint specific guidance, Chapter R.7c; section R.7.12.2.1). Two supporting metabolism studies are available (Bonting, 1952 and 1956).

Value used for CSA:

Bioaccumulation potential: no bioaccumulation potential

Absorption rate - oral (%): 100

Absorption rate - dermal (%): 100

Absorption rate - inhalation (%): 100

5.2. Acute toxicity

5.2.1. Non-human information

5.2.1.1. Acute toxicity: oral

The results of studies on acute toxicity after oral administration are summarised in the following table:

Table 16. Studies on acute toxicity after oral administration

Method	Results	Remarks	Reference
rat male/female	LD50: 1530 — 3400 mg/kg bw (male/female) based on: test mat.	4 (not assignable) supporting study Secondary data source **Test material (EC name): orthophosphoric acid**	Bibra toxicology advice and consulting (1993a)
rat (SPF-Wister K) female oral: gavage Phosphoric acid was administered as a 10% aqueous solution at different doses by gavage using a stomach tube.	LD50: 1.7 mL/100 g body weight (female) (no data on calculation method)	4 (not assignable) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Laboratory for Commercial and Pharmaceutical Toxicology (1968)
rat (Sprague-Dawley) male/female oral: gavage Calculation of the LD50s was done according to the method of E.J. de Beer.	LD50: 3500 mg/kg bw (male/female) based on: test mat. (85 % aqueous solution phosphoric acid) LD50: 4200 mg/kg bw (male/female) based on: test mat. (80 % aqueous solution phosphoric acid) LD50: 4400 mg/kg bw (male/female) based on: test mat. (75 % aqueous solution phosphoric acid)	3 (not reliable) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Randall DJ and Robinson EC (1976)
rat female oral: gavage OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)	LD50: > 300 — < 2000 mg/kg bw (female) based on: test mat.	4 (not assignable) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (NIER), Korea (2005a)
rat female No data	LD50: 1500 mg/kg bw (female) based on: test mat.	4 (not assignable) weight of evidence experimental result **Test material (EC name): orthophosphoric**	Scholz and Weigand (1964)

Method	Results	Remarks	Reference
		acid	
rat (Wistar) male/female oral: gavage Single dose administration	approx. LD50: ca. 3380 mg/kg bw (male/female) based on: test mat.	4 (not assignable) weight of evidence experimental result **Test material (Identified by hand as 85% phosphoric acid): MCTR-1-75**	Terrell Y, Parke E (1975a)
rat (Wistar) male/female oral: gavage Code of Federal Regulations, section 1500	LD50: < 5000 mg/kg bw (male/female)	4 (not assignable) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Terrell Y, Parke E (1975b)
mouse oral: gavage no data	LD50: 1250 mg/kg bw based on: test mat.	4 (not assignable) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Sigova NV (1983a)

5.2.1.2. Acute toxicity: inhalation

Data waiving

Information requirement: Acute toxicity after inhalation exposure

Reason: other justification

Justification: In accordance with Annex VIII, Section 8.5, Column 2 of Regulation No. 1907/2006 (REACH) an acute toxicity test does not need to be conducted if the substance is classified as corrosive to the skin. Phosphoric acid is classified as a skin corrosive (category 1B) and therefore the acute inhalation study does not need to be conducted.

5.2.1.3. Acute toxicity: dermal

The results of studies on acute toxicity after dermal administration are summarised in the following table:

Table 17. Studies on acute toxicity after dermal administration

Method	Results	Remarks	Reference
rabbit (New Zealand White)	Dose level: > 2000 mg/kg bw based on: test mat.	4 (not assignable) supporting study experimental result **Test material (Identified by hand as 85% phosphoric**	Becker J, Parke E (1975)

Method	Results	Remarks	Reference
		acid): MCTR-1-75	
rabbit (New Zealand White)	: (No LD50 determined)	4 (not assignable) supporting study experimental result **Test material (Identified by hand as phosphoric acid): MCTR-192-77**	Imlay P, Parke E (1977)

Data waiving

Information requirement: Acute toxicity after dermal administration

Reason: other justification

Justification: In accordance with Annex VIII, Section 8.5, Column 2 of Regulation No. 1907/2006 (REACH) an acute toxicity test does not need to be conducted if the substance is classified as corrosive to the skin. Phosphoric acid is classified as a skin corrosive (category 1B) and therefore the acute dermal study does not need to be conducted.

5.2.1.4. Acute toxicity: other routes

No relevant information available

5.2.2. Human information

No relevant information available

5.2.3. Summary and discussion of acute toxicity

Acute toxicity: oral

A weight of evidence assessment based on available data is made for the endpoint. As phosphoric acid is classified as corrosive no further testing is proposed. Acute toxicity: inhalation No reliable data are available for phosphoric acid. Acute dermal toxicity No reliable data are available for phosphoric acid. As phosphoric acid is classified as corrosive to the skin it is anticipated that adequated protective measures are in place to prevent exposure via the dermal route.

The following information is taken into account for any hazard / risk assessment:

Acute toxicity: oral

A number of Klimisch 4 studies are available, these support the weight of evidence for a classification as category 4.

Acute toxicity: inhalation

No reliable data on phosphoric acid are available for the inhalation route of exposure.

Acute toxicity: dermal

No reliable data on phosphoric acid are available for the dermal route of exposure.

Value used for CSA:

Acute oral toxicity: Adverse effect observed (LD50: 300 mg/kg bw)

Acute dermal toxicity: No study available

Acute inhalation toxicity: No study available

Justification for classification or non classification

In accordance with Regulation (EC) No. 1272/2008 on classification, labelling and packaging (CLP) of substances and mixtures phosphoric acid is classified as acute oral category 4.

In accordance with Regulation (EC) No. 1272/2008 on classification, labelling and packaging (CLP) of substances and mixtures phosphoric acid is not considered to be classifed for acute inhalation or dermal effects.

5.3. Irritation

5.3.1. Skin

5.3.1.1. Non-human information

The results of studies on skin irritation are summarised in the following table:

Table 18. Studies on skin irritation

Method	Results	Remarks	Reference
rabbit (Vienna White) Coverage: (shaved) Vehicle: unchanged (no vehicle) 1500.41 in the Federal Register Vol. 38, No. 187, S. 26019 from 1973-09-27	not irritating (19% phosphoric acid) Erythema score: 1 of max. 4 (animal #1) (Time point: 4 and 24 hours) (fully reversible within: 48 hours) 0 of max. 4 (animal #2) (Time point: all time points) Edema score: 0 of max. 4 (animal #1) (Time point: all time points) 0 of max. 4 (animal #2) (Time point: all time points)	2 (reliable with restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	BASF Gewerbehygiene und Toxikologie (1980a)
mouse Estimation by calculation	irritating (5% and 30% of phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bucher K Bucher KE and Walz, D (1981)
rabbit (yellow-silver breed)	at a dilution of 1:10 phosphoric acid produced a weak redness in 3 out of 5 animals after the second and third treatment.	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Hoechst AG (1968a)
rat (Wistar) Coverage: open (shaved) Open patch test with rat, mouse and guinea pig was performed. Followed	irritating (phosphoric acid caused effects at a minium dose level of 50 mg/kg bw)	3 (not reliable) supporting study experimental result **Test material (EC**	Sekizawa J, Yasuhara K, Suyama Y, Yamanaka S, Tobe M and Nishimura M (1994a)

Method	Results	Remarks	Reference
by intradermal injections in the rat, mouse and guinea pig. Skin reactions were observed for one week after application.		**name): orthophosphoric acid**	
rabbit (albino rabbits) Coverage: occlusive (clipped free of air on the back) equivalent or similar to OECD Guideline 404 (Acute Dermal Irritation / Corrosion)	Under the test condition phosphoric acid 30% was not corrosive	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Swain, EE, Jr. (1974)
rabbit Secondary reference	servere irritation noted after application of 595 mg phosphoric acid	4 (not assignable) supporting study secondary literature **Test material (EC name): orthophosphoric acid**	Bibra toxicology advice and consulting (1993b)
The evaluation of skin reactions were based upon the degree of erythema/eschar and/or oedema observed at four occasions after the exposure	phosphoric acid exhibited irritation/corrosive properties (concentration not specified)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Loden M, Häggqvist I and Karlsson N (1985)
rabbit Coverage: occlusive Patch test in accordance with a standardised test method which was proposed by VCI in the 1970's	irritating (100% phosphoric acid)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Henkel AG & Co. (1977)
human (EpiSkinTM reconstructed human epidermis model) Coverage: open in vitro system (intact reconstructed human epidermis) Vehicle: water OECD Guideline 431 (In Vitro Skin Corrosion:	not classified (5% phosphoric acid) Relative mean tissue viability (%): 94.1 of max. 100 (mean value test item) (Time point: 3 minutes) (reversibility not applicable) Relative mean tissue viability (%): 85.5 of max. 100 (mean value test item) (Time point: 60 minutes) (reversibility not applicable) Relative mean tissue viability (%): 53.9	1 (reliable without restriction) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Warren N (2014a)

Method	Results	Remarks	Reference
Human Skin Model Test) EU Method B.40 (Skin Corrosion)	of max. 100 (mean value test item) (Time point: 240 minutes) (reversibility not applicable) Relative mean tissue viability (%): 3.5 of max. 100 (mean value positive control item) (Time point: 240 minutes) (reversibility not applicable) Relative mean viability (%): 100 of max. 100 (mean value negative control item) (Time point: 240 minutes) (reversibility not applicable) (The mean viability of the negative control tissues is set at 100%)		
rabbit (New Zealand White) Coverage: semiocclusive (shaved) Vehicle: unchanged (no vehicle) equivalent or similar to OECD Guideline 404 (Acute Dermal Irritation / Corrosion)	not irritating (75% phophoric acid)	3 (not reliable) disregarded study experimental result **Test material (EC name): orthophosphoric acid**	Freeman C (1988)

Studies with results indicating corrosivity to the skin are summarised in section 5.4 Corrosivity.

5.3.1.2. Human information

No relevant information available

5.3.2. Eye

5.3.2.1. Non-human information

The results of studies on eye irritation are summarised in the following table:

Table 19. Studies on eye irritation

Method	Results	Remarks	Reference
human Case study	Data not sufficient for classification and labelling purposes.	4 (not assignable) supporting study handbook data **Test material (EC name): orthophosphoric acid**	Grant WM (1974)
rabbit (New Zealand White) Vehicle: unchanged (no vehicle) Code of Federal	85% phosphoric acid was considered to be a 'severe irritant'	4 (not assignable) supporting study experimental result **Test material**	Becker J and Parke G (1975a)

Method	Results	Remarks	Reference
Regulations, section 1500.42		**(Identified by hand as 85% phosphoric acid): MCTR-1-75**	
rabbit	Severe irritation resulted form the instillation of 119 mg phosphoric acid into rabbit eye	4 (not assignable) supporting study secondary literature **Test material (EC name): orthophosphoric acid**	Bibra toxicology advice and consulting (1993b)
rabbit (New Zealand White) Vehicle: unchanged (no vehicle) Code of Federal Regulations, section 1500.42 and the Draize method	irritating	4 (not assignable) supporting study experimental result **Test material (Identified by hand as rinse phosphoric acid): MCTR-51-76**	Becker J and Parke G (1976)
rabbit (yellow-silver breed) Study focus is on the tolerance of the mucous membrane.	A reaction was observed for the 1:10 dilution of 75.4% phosphoric acid	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Hoechst AG (1968b)
rabbit (New Zealand White) 100µL dropped into 1 eye while the other served as a control, eyes were not washed; erythema, chemosis, iritis and corneal opacity were scored according to the Draize scale; the mean erythema, chemosis and corneal opacity scores were calculated for all six rabbits and the scores at 24, 48 and 72 hours were pooled	not irritating (17% phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Jacobs GA & Martens MA (1989)
rabbit in vivo eye irritation. Study focus on edema production	study not appropriate for classification and labelling	3 (not reliable) supporting study experimental result **Test material (EC name):**	Larson P, Finnegan JK and Haag HB (1956)

Method	Results	Remarks	Reference
		orthophosphoric acid	
rabbit Vehicle: water OECD Guideline 405 (Acute Eye Irritation / Corrosion)	not irritating (10 to 17% phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Jacobs GA (1992)
Validation of screening test to detect irritating substances. the test is based upon a combination of physicochemical test and stepwise animals tests using rodents arranged to obtain the required information using a minimal number of animals.		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Sekizawa J, Yasuhara K, Suyama Y, Yamanaka S, Tobe M and Nishimura M (1994b)
rabbit 0.1 mL of the test solutions was instilled into each of two rabbit eyes. Twenty seconds after instillation one eye was washed with water for one minute. The other eye was not washed. Examinations were made with the unaided eye using strong artificial light and with the hand slit lamp after two hours on the day of treatment and daily for three days thereafter. In addition, in the test with the 4% solutions, examinations were made six and seven days after treatment.	irritating (24% phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Haskell Laboratory for Toxicology and Industrial Medicine (1964a)
rabbit 0.1 mL of aqueous solutions of the test material was instilled into the conjunctival sacs of each of three pairs of rabbit eyes. one eye of each pair was washed with water for one minute, 20 seconds after instillation; the other eye	Study not suitable for classification and labelling purposes	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Haskell Laboratory for Toxicology and Industrial Medicine (1964b)

Method	Results	Remarks	Reference
was not washed. Observations were made with the aid of strong artificial light and the hand slit lamp at one and four hours on the day of treatment and one, two, three, four and seven days thereafter.			

Studies with results indicating corrosivity to the eye are summarised in section 5.4 Corrosivity.

Data waiving

Information requirement: Eye irritation

Reason: other justification

Justification: In accordance with Annexes VII and VIII, Section 8.2, column 2 of Regulation EC No. 1907/2006 (REACH) studies are not required for eye irritation of phosphoric acid. Phosphoric acid is classified as a skin corrosive substance category 1B (concentration > or = 25%) and an eye irritant (10% < or = concentration < 25%) according to the CLP Regulation Annex VI, Table 3.1 (EC Regulation 1272/2008 on the classification, labelling and packaging of substances and mixtures). Therefore, according to the REACH Regulation, in vitro testing for eye irritation with this substance does not need to be conducted (column 2 adaptation, Annex VII, section 8.2) and in vivo testing can also be waived (column 2 adaptation, Annex VIII, section 8.2.1).

5.3.2.2. Human information

No relevant information available

5.3.3. Respiratory tract

5.3.3.1. Non-human information

5.3.3.2. Human information

The exposure-related observations in humans are summarised in the following table:

Table 20. Exposure-related observations on respiratory irritation in humans

Method	Results	Remarks	Reference
Study type: medical monitoring Details on study design: The investigation of the 35 subjects included: history, according to the C.E.C.A. questionnaire for chronic bronchitis and emphysema; physical examination, chest X-ray, spirometry and lung diffusing capacity for carbon monoxide by the stead state method (DLCOSS). Endpoint addressed: respiratory irritation	High prevalence of chronic bronchitis (45.7%), obstructive spirometric impairment (37.1%), and decreased values of DLCOSS (31.4%) were detected. Two subjects were found to be affected with p1/0 and 7 with p0/1 pneumoconiosis. Such findings were significantly related to the length of working activity as well as to dust and gaseous fluoride (hydrofluoric acid, hexafluorosilic acid and silicon tetrafluoride) exposure.	3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid** ACTIONERROR: Could not create action. ruleId:CSR-05.02.03.02-RL0020-SR203-TableResults ruleSpec:UNDEFINED Error:eu.eca.iucl	Fabbri L. (1977)

Method	Results	Remarks	Reference
		id.server.plugin.reporting.integration.reportgenerator.rulehandler.RuleException: No rule definition found for rule ID: 'CSR-05.02.03.02-RL0020-SR203-TableResults' message: No rule definition found for rule ID: 'CSR-05.02.03.02-RL0020-SR203-TableResults'	
Subjects: See Field 'Any other information on materials and methods incl. tables' Endpoint addressed: respiratory irritation		3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Sigova NV (1983b)

5.3.4. Summary and discussion of irritation

The following information is taken into account for any hazard / risk assessment:

Skin irritation / corrosion

A number of in vivo studies were available for phosphoric acid but these studies were not performed according to current guidelines or under the conditions of GLP. For the purpose of classification and labelling, in vitro corrosivity studies were performed to an appropriate and validated test method under the conditions of GLP on solutions of phosphoric acid. These are presented as a weight of evidence.

Eye irritation:

No reliable data are available for the eye irritation endpoint. Nevertheless as the substance is classified as corrosive to the skin, a classification for eye damage is also required. This is conclusion is in accordance with the results of the supporting studies presented under this endpoint..

Value used for CSA:

Skin irritation / corrosion: Adverse effect observed (corrosive)

Eye irritation / corrosion: Adverse effect observed (corrosive)

Respiratory irritation / corrosion: No study available

Justification for classification or non classification

Skin irritation:

According to harmonised classification of orthophosphoric acid as reported in Annex VI of Regulation (EC) No. 1272/2008 the substance is classified as corrosive to skin, category 1B with the following concentration limits:

Skin Irrit. 2; H315: 10% ≤ C < 25%

Skin Corr. 1B; H314: C ≥ 25%

The registrant has performed additional in vitro corrosivity studies which support this classification of category 1B but suggests skin corrosion occurs at ≥ 10%.

Eye irritation:

According to harmonised classification of orthophosphoric acid as reported in Annex VI of Regulation (EC) No. 1272/2008 the substance is considered to be an eye irritant, category 2 with a concentration limit of 10% ≥ C < 25%

5.4. Corrosivity

5.4.1. Non-human information

The results of studies on skin and eye irritation related to corrosivity are summarised in the following table:

Table 21. Studies on skin and eye irritation related to corrosivity

Method	Results	Remarks	Reference
Tissue studied: skin rabbit (Vienna White) Coverage: (all test sites were shaved, half of the test sites were abraded) Vehicle: unchanged (no vehicle) 1500.41 in the Federal Register Vol. 38, No. 187, S. 26019 from 1973-09-27	corrosive (80% phosphoric acid) Erythema score: 4 of max. 4 (mean) (Time point: 24 and 72 hours) (not reversible (within 72 hours post-dosing)) Edema score: 2.8 of max. 4 (mean) (Time point: 24 hours) (not fully reversible within: 72 hours post-dosing) (1 score was 2, 5 scores were 3) 2.3 of max. 4 (mean) (Time point: 72 hours) (not fully reversible within: 72 hours post-dosing) (4 scores were 2, 2 scores were 3) 3 of max. 4 (mean) (Time point: 24 hours) (not fully reversible within: 72 hours post-dosing) (all scores were 3) 2.2 of max. 4 (mean) (Time point: 72 hours) (not fully reversible within: 72 hours post-dosing) (5 scores were 2, 1 score was 3)	2 (reliable with restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	BASF Gewerbehygiene und Toxikologie (1980b)
Tissue studied: skin rabbit Coverage: occlusive (abraded) A Draize test in accordance with the Code of Federal Regulations (Part 191.11, Chap. 1,	corrosive (52% solution of phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bullock and Kamienski (1971a)

Method	Results	Remarks	Reference
Title 21) was performed. The following modifications were made: procedure was modified to allow for a 1-hr exposure instead of a 24-hr exposure.			
Tissue studied: skin rabbit Coverage: occlusive (abraded) A modified Draize dermal procedure outlined in the Code of Federal Regulations (Part 191.11, Chap. 1, Title 21) was followed.	corrosive (70% solution of phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bullock and Kamienski (1971b)
Tissue studied: skin in vitro study Validation study of in vitro method.	Corrosive: 25% -irritant: 10%	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Young JR, How MJ, Walker AP and Worth MH (1988)
Tissue studied: skin rabbit (New Zealand White) Coverage: semiocclusive (clipped) Skin responses were scored in accordance with Federal Hazardous Substance Act, 21 CFR, 191.11 (1964).	corrosive (Solutions from 75% to 85% phosphoric acid)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Randall DJ & Robinson EC (1977a)
Tissue studied: skin rabbit (New Zealand White) Coverage: semiocclusive (clipped) Skin responses were scored in accordance with the Classification of Corrosive Hazards-Department of Transportation, Federal Register, Volume 37, Number 57, 173.240	corrosive (Phosphoric acid 85%)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Randall DJ & Robinson EC (1977b)

Method	Results	Remarks	Reference
(March, 1972)			
Tissue studied: skin rabbit Coverage: occlusive No data.	corrosive (100% phosphoric acid)	4 (not assignable) supporting study review article **Test material (EC name): orthophosphoric acid**	Weiner ML (2001)
Tissue studied: skin rabbit (New Zealand White) Coverage: (abraded and non-abraded test sites used) Code of Federal Regulations, section 1500.41	corrosive (Test substance (MCTR-1-75, identified by hand as 85% phosphoric acid) Erythema score: 4 of max. 4 (mean) (Time point: 24, 72 hours) (not fully reversible within: 72 hours) Edema score: 3 of max. 3 (mean) (Time point: 24, 72 hours) (not fully reversible within: 72 hours)	4 (not assignable) supporting study experimental result **Test material (Identified by hand as 85% phosphoric acid): MCTR-1-75**	Becker J and Parke G (1975b)
Tissue studied: skin rabbit (New Zealand White) Coverage: occlusive (clipped) Single dermal application	corrosive (75% phosphoric acid)	3 (not reliable) supporting study experimental result **Test material: >>>??? ID missing in IUCLID<<<**	Lewis AC & Palanker AL (1979)
Tissue studied: skin human (EpiSkinTM Reconstructed Human Epidermis Model) Coverage: open in vitro system (intact reconstructed human epidermis) Vehicle: water OECD Guideline 431 (In Vitro Skin Corrosion: Human Skin Model Test) EU Method B.40 (Skin Corrosion)	Category 1B (corrosive) (20% phosphoric acid solution) Relative mean tissue viability (%): 110.8 of max. 100 (mean value test item) (Time point: 3 minutes) (reversibility not applicable) Relative mean tissue viability (%): 48.1 of max. 100 (mean value test item) (Time point: 60 minutes) (reversibility not applicable) Relative mean tissue viability (%): 6.9 of max. 100 (mean value test item) (Time point: 240 minutes) (reversibility not applicable) Relative mean viability (%): 3.5 of max. 100 (mean value positive control item) (Time point: 240 minutes) (reversibility not applicable) Relative mean tissue viability: 100 of max. 100 (mean value negative control	1 (reliable without restriction) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Warren N (2014b)

Method	Results	Remarks	Reference
	item) (Time point: 240 minutes) (reversibility not applicable) (The mean viability of the negative control tissues is set at 100%)		
Tissue studied: skin human (EpiSkin Reconstructed Human Epidermis Model) Coverage: open in vitro system (intact reconstructed human epidermis) Vehicle: water OECD Guideline 431 (In Vitro Skin Corrosion: Human Skin Model Test) EU Method B.40 (Skin Corrosion)	Category 1B (corrosive) (10% phosphoric acid) Relative mean tissue viability (%): 104.4 of max. 100 (mean value test item) (Time point: 3 minutes) (reversibility not applicable) Relative mean tissue viability (%): 47.4 of max. 100 (mean value test item) (Time point: 60 minutes) (reversibility not applicable) Relative mean tissue viability (%): 6.4 of max. 100 (mean value test item) (Time point: 240 minutes) (reversibility not applicable) Relative mean tissue viability (%): 3.5 of max. 100 (mean value positive control item) (Time point: 240 minutes) (reversibility not applicable) Relative mean tissue viability (%): 100 of max. 100 (mean value negative control item) (Time point: 240 minutes) (reversibility not applicable) (The mean value of the negative control tissues is set at 100%)	1 (reliable without restriction) weight of evidence experimental result **Test material (EC name): orthophosphoric acid**	Warren N (2014c)
Tissue studied: eye rabbit (New Zealand) Code of Federal Regulations (Part 191.12, Chapter 1, Title 21)	corrosive (70% phosphoric acid)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bullock and Kamienski (1971b)
Tissue studied: eye rabbit (New Zealand White) 0.1 mL of commercial preparations of phosphoric acid of varying concentrations were placed into the conjunctival sac of New Zealand albino rabbits. Eye responses were scored in accordance with the Federal Hazardous Substances Act, 21 CFR,	corrosive (75%-85% phosphoric acid)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Randall DJ & Robinson EC (1976)

Method	Results	Remarks	Reference
§ 191.12 (1964).			

5.4.2. Human information

5.4.3. Summary and discussion of corrosion

The studies with results indicating corrosivity are discussed in section 5.3.4 Summary and discussion of irritation.

5.5. Sensitisation

5.5.1. Skin

5.5.1.1. Non-human information

Data waiving

Information requirement: Skin sensitisation

Reason: study scientifically unjustified

Justification: According to Annex VIII, Section 8.3 of Regulation (EC) No. 1907/2006 (REACH) a study for skin sensitisation does not need to be conducted if the substance is classified for skin corrosion. Phosphoric acid is classified as a skin corrosive substance category 1B (concentration ≥25%) according to Annex VI, Table 3.2 of Regulation (EC) No. 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP) and therefore no study is required.

5.5.1.2. Human information

The exposure-related observations in humans are summarised in the following table:

Table 22. Exposure-related observations on skin sensitisation in humans

Method	Results	Remarks	Reference
Study type: study with volunteers	From Payne review: Stinging sensations following facial application of phosphoric acid during profuse sweating have been studied (Frosch and Kligman 1977). In the c.20% of individuals who demonstrated a high susceptibility to such effects, identified by reactions to topically applied lactic acid, an immediate but transient, generally mild to moderate, stinging response was experienced within the first 10 seconds of exposure to 5% phosphoric acid followed by a more severe stinging sensation 2-5 minutes after exposure. A similarly severe response was experienced on application of 3 ,3% solutions while application ol 1% solutions produced only a slight response. For "non-stingers" 5% phosphoric acid produced a generally mild-moderate stinging sensation 2.5	4 (not assignable) supporting study **Test material (EC name): orthophosphoric acid**	Frosch P J and Kligman A M (1977)

Method	Results	Remarks	Reference
	minutes after exposure. The intensity of stinging and obseruable irritant reactions for a range of chemicals was reported not to be directly correlated.		

5.5.2. Respiratory system

5.5.2.1. Non-human information

No relevant information available

5.5.2.2. Human information

5.5.3. Summary and discussion of sensitisation

Skin sensitisation

The following information is taken into account for any hazard / risk assessment:

No study submitted in accordance with Annex VIII, section 8.4, column 2 of Regulation (EC) No. 1907/2006 (REACH).

Value used for CSA: No study available

Respiratory sensitisation

The following information is taken into account for any hazard / risk assessment:

No data

Value used for CSA: No study available

Justification for classification or non classification

Phosphoric acid is classified as corrosive to the skin, thus a further assessment for skin sensitisation is not necessary.

5.6. Repeated dose toxicity

5.6.1. Non-human information

5.6.1.1. Repeated dose toxicity: oral

The results of studies on repeated dose toxicity after oral administration are summarised in the following table:

Table 23. Studies on repeated dose toxicity after oral administration

Method	Results	Remarks	Reference
rat male/female subchronic (oral: feed) 0.3, 1.0 and 3.0% (nominal in diet) Male: 155.36, 545.64 and 1796.95 mg/kg bw/day Female: 181.18, 701.65 and 2070.10 mg/kg bw/day (Calculated using the mean of the weekly body weight and food	no NOAEL identified: (overall effects Histopathology: Microconcretions in the renal tubules of the female rats from all three dose levels) LOAEL: 155 mg/kg bw/day (actual dose received) (male/female) based on: test	2 (reliable with restrictions) key study read-across from supporting substance (structural analogue or surrogate) **Test material (EC**	Smith PS (1972a)

Method	Results	Remarks	Reference
consumption) Vehicle: unchanged (no vehicle) Exposure: 90 day exposure (Continuous exposure in feed) A 90-day oral toxicity study was conducted with groups of albino rats fed Levn-Lite at dietary levels of 0.3, 1.0 and 3.0%.	mat. (Nephrocalcinosis)	**name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	
dog (Beagle) male/female subchronic (oral: feed) 0.3, 1.0 and 3.0% (nominal in diet) Male: 94.23, 322.88 and 1107.12 mg/kg bw/day Female: 129.31, 492.77 and 1433.56 mg/kg bw/day (Calculated using the mean of the weekly body weight and food consumption (Week 5 has been discounted from the 492.77 mg/kg bw/day femal group due to illegible figures in the report)) Vehicle: unchanged (no vehicle) Exposure: 90 days (Continuous exposure in feed) A 90 day oral toxicity study was conducted with purebred beagle dogs fed KASAL at dietary levels of 0.3, 1.0 and 3.0%.	NOAEL: 322.88 mg/kg bw/day (nominal) (male) based on: test material, calculated based on food consumption (histopathology; specific to kidneys) NOAEL: 492.77 mg/kg bw/day (nominal) (female) based on: test material, calculated based on food consumption (histopathology; specific to kidneys)	2 (reliable with restrictions) key study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: powder	Mastalski K (1972a)
rat (Sprague-Dawley) male/female combined repeated dose and reproduction / developmental screening (oral: gavage) 0, 125, 250 and 500 mg/kg Vehicle: water Exposure: The males were administrated once daily during 2 weeks prior to mating, the 2 weeks of mating period, and 2 weeks after mating (total 6 weeks). The females of the main group were administrated once daily from 2 weeks before mating to Day 4 post partum (approximately 54 days). The females of the recovery group (without mating) were administrated approximately 54 days (applied equally main group females). Also,	NOAEL: 250 mg/kg (male/female) (Two dead females in the 500 mg/kg treatment group had occurred, and findings of gaseous distension of gastrointestinal tract were observed. Mucous stool, soft stool, and dirty nose were observed in one male of the 500 mg/kg treatment group. Therefore, a NOAEL for repeated dose toxicity was determined at 250 mg/kg in all males and females.)	1 (reliable without restriction) supporting study experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (2008)

Method	Results	Remarks	Reference
coitus was confirmed, but females did not show gestational signs, and were administrated until gestation Day 26. (Daily) OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)			
rat (Sprague-Dawley) male subacute (oral: feed) control diet; 7'000 and 30'000 ppm Kasal II; 30'000 ppm Kasal; 14'470 ppm aluminium hydroxide (nominal in diet) 5 (control), 67 and 288 (Kasal II), 141 (Kasal) and 302 mg/Kg bw (aluminium hydroxide) (calculated as average dose for each dose group) Vehicle: unchanged (no vehicle) Exposure: 28 d (daily (via food)) equivalent or similar to OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)	no NOAEL identified: (male) (Even at the highest doses of 288 or 302 mg/Kg/d (30'000 ppm Kasal II and 14'470 ppm Al(OH)3, respectively) no adverse effects were seen)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: not reported, expected to be solid	Hicks JS, Hackett DS & Sprague GL. (1987)
rat (Sprague-Dawley) male subacute (oral: feed) 30,000 ppm (KASAL) (nominal in diet) 2436 mg/kg bw/day (Calculated using the mean of the daily food consumption) 30,000 and 7,000 ppm (KASAL II) (nominal in diet) 2471 and 558 mg/kg bw/day (Calculated using the mean of the daily food consumption) Vehicle: corn oil Exposure: 28 days (daily) equivalent or similar to OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)	NOAEL: 2436 mg/kg bw/day (nominal) (male) based on: nominal in diet (KASAL overall effects) NOAEL: 2470 mg/kg bw/day (nominal) (male) based on: Nominal in diet (KASEL II overall effects)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium aluminium phosphate (See endpoint summary for justification of read-across)** Form: powder	Sprague GL (1986)
rat male/female subacute (oral: feed) 1, 3, 5 and 7% (nominal in diet)	no NOAEL identified:	2 (reliable with restrictions) supporting study	Smith PS (1972b)

Method	Results	Remarks	Reference
Vehicle: unchanged (no vehicle) Exposure: 30 days (Continuous exposure to feed.) Three samples identified as Levair, Kasal and Leven-lite were received for the purpose of conducting 30-day pilot studies using albino rats as test animals. The animals were fed the test materials at dietary levels of 1.0, 3.0, 5.0 and 7.0% and changes in their body weight and food consumption were then assessed.		read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium aluminium phosphate (See endpoint summary for justification of read-across)** Form: likely to be solid.	
rat (Wistar) male subacute (oral: feed) 150 mmol phosphorus/kg diet, equivalent to 1698 mg/kg bw/day potassium dihydrogenorthophosphate (assuming an average rat weight of 210g) (nominal in diet) 464 mmol phosphorus /kg diet, equivalent to 4300 mg/kg bw/day potassium dihydrogenorthophosphate (assuming an average rat weight of 210g) (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 21 days (The rats were given free access to the assigned diet and demineralized water throughout the experimental period.) Rats were fed on a diet containing potassium dihydrogenorthophosphate or pentapotassium triphosphate at the normal phosphorus level or at a high phosphorus level for 21 d. Urine was collected on days 20-21 by use of metabolic cages. After the treatment, the animals were sacrificed, blood was obtained by exsanguination and the kidneys were removed. One kidney, feces and urine samples were ashed and analyzed for calcium, magnesium and phosphorus. Further urinalysis was also conducted. The other kidney was examined histopathologically	no NOAEL identified: (No concentration-dependent dosing regimen was used.)	4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): potassium dihydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: solid	Matsuzaki H, Kikuchi T, Kajita Y, Masuyama R, Uehara M, Goto S, Suzuki K (1999)

Method	Results	Remarks	Reference
and stained with H&E and Von Kossa stain to detect renal calcification.			
rat (Wistar) male subacute (oral: feed) 149 mmol phosphorus/kg diet, equivalent to 1515 mg/kg bw/day sodium dihydrogenorthophosphate (assuming an average rat weight of 210g) (nominal in diet) 484 mmol phosphorus /kg diet, equivalent to 3622 mg/kg bw/day sodium dihydrogenorthophosphate (assuming an average rat weight of 210g) (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 21 days (The rats were given free access to the assigned diet and demineralized water throughout the experimental period.) Rats were fed on a diet containing sodium dihydrogenorthophosphate, potassium dihydrogenorthophosphate, pentasodium triphosphate, or pentapotassium triphosphate at the normal phosphorus level or at a high phosphorus level for 21 d. Feces and urine were collected on days 20-21 by use of metabolic cages. After the treatment, the animals were sacrificed, blood was obtained by exsanguination and the kidneys were removed. One kidney, faeces and urine samples were ashed and analyzed for calcium, magnesium and phosphorus. Further urinalysis was also conducted. The other kidney was examined histopathologically and stained with Von Kossa stain to detect renal calcification.	no NOAEL identified: (No concentration-dependent dosing regimen was used.)	4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: solid	Matsuzaki H, Kikuchi T, Kajita Y, Masuyama R, Uehara M, Goto S, Suzuki K (1999)
rat (RIV-TOX) female subacute (oral: feed) 0.25% Ca; 0.20% P (nominal in diet) 0.25% Ca; 0.40% P (nominal in diet) 0.50% Ca; 0.40% P (nominal in diet)	no NOAEL identified:	4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC**	Ritskes-Hoitinga J, Lemmens AG, Beynen AC (1989)

Method	Results	Remarks	Reference
0.50% Ca; 0.80% P (nominal in diet) Exposure: 4 weeks (assumed to be daily) Female RIV-TOX rats were fed semipurified diets with different calcium and phosphate concentrations for 4 weeks. Nephrocalcinosis was determined chemically (by the analysis of calcium and phosphorus in the kidney) and histologically (by Von Kossa and H&E staining of kidney slices). In a separate experiment indicators of kidney function were assessed and distribution of calcification in different organs was examined by gross necropsy.		**name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	
rat male subchronic (oral: feed) 80'000 ppm (nominal in diet) Exposure: 7 months via diet (daily/via diet) Adult male rats were fed 8% of sodium phosphate monobasic or 8% sodium metaphosphate in the diet for 7 months. Animals were analysed for bone calcification via X-ray analysis during study. After sacrifice animals were subjected to gross necroscopy and parathyroid, kidneys and bones were analysed histopathologically.		4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): Sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Saxton JA jr. & Ellis GH (1941)
rat (Wistar) male subchronic (oral: feed) Orthophosphate 0.4 and 1.2 % (nominal in diet) Metaphosphate 0.4 and 1.2 % (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 50, days, 60 days, 150 days (Continuous) Normal and high levels of phosphorous (0.4 and 1.2% P) in the form of orthophosphate and metaphosphate were fed to male rats over 150 days. Experimental	no NOAEL identified: (Too limited clinical investigation (hematology), organ weights and histology.)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: powder	Dymsza HA et al. (1959)

Method	Results	Remarks	Reference
observations were made at 50, 60 and 150 days.			
rat female subchronic (oral: feed) 300 and 1000 ppm (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: Up to 90 days exposure (Continuous exposure in feed) A 90 day oral toxicity study was conducted with groups of female albino rats fed Levn-Lite at dietary levels of 300 and 1000 ppm. Investigations were limited to general parameters and kidney weights.	no NOAEL identified:	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	Reyna MS (1973)
rat (Albino, not further specified) male/female subchronic (oral: feed) 0, 0.3, 1.0 and 3.0 % (nominal in diet) Male 172.66, 562.74 and 1803.11 mg/kg bw/day Female 205.62, 701.32 and 2113.79 mg/kg bw/day (Calculated using the mean of the weekly body weight and food consumption) Vehicle: unchanged (no vehicle) Exposure: 90 days (Continuous exposure in feed) A 90-day oral toxicity study was conducted with groups of albino rats fed KASAL at dietary levels of 0.3, 1.0 and 3.0%.	no NOAEL identified: LOAEL: 172.66 mg/kg bw/day (nominal) (male/female) based on: test mat.	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	Smith PS (1972c)
rat (Charles River Strain) male/female subchronic (oral: feed) 0, 0.3, 1.0 and 3.0 % (nominal in diet) Male 182.57, 594.65 and 1909.53 mg/kg bw/day Female 210.09, 693.99 and 1988.42 mg/kg bw/day (Calculated using the mean of the weekly body weight and food consumption)	no NOAEL identified: LOAEL: 182.57 calculated (male/female) based on: test mat.	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See**	Smith PS (1972d)

Method	Results	Remarks	Reference
Vehicle: unchanged (no vehicle) Exposure: 90 days (Continuous exposure in feed) A 90-day oral toxicity study was conducted with groups of albino rats fed LEVAIR at dietary levels of 0.3, 1.0 and 3.0%.		**endpoint summary for justification of read-across)** Form: powder	
rat (Mus norvegicus) male/female chronic (oral: feed) 0.05; 0.15; 0.40 and 0.75% (further information see Field Any other information on material and methods including tables) (nominal in diet) Exposure: Up to 12 months depending on the effect studied (No data) Prolonged intake of phosphoric acid was investigated in rats. Tissue analysis, reproductive capacity and the second generation were studied. The rat was chosen as an experimental animal, because of all smaller laboratory animals it resembles man most closely in matters of nutrition and metabolism.	NOAEL: > 0.75 % (male/female) based on: test mat.	2 (reliable with restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bonting SL (1952b) Bonting S.L. and Jansen B.C. (1956)
dog (Beagle) male/female subchronic (oral: feed) 0.8 g K2PO4/kg bw. and day (Total dose including phosphate contained in basic low phosphate feed. Control animals received standard feed.) Vehicle: unchanged (no vehicle) Exposure: First experiment: 38 weeks Second experiment 14 weeks (daily) Dietary administration over 38 or 14 weeks, Limited clinical and biochemical investigations in vivo and some biopisies. Detailed kidney pathology (light and electron microscpy) and immunohistochemistry.		2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	Schneider P, Pappritz G, Müller-Peddinghaus R, Bauer M, Lehmann H (1980a)
dog (Beagle) male/female subchronic (oral: feed)		2 (reliable with restrictions)	Schneider P, Pappritz G, Müller-

Method	Results	Remarks	Reference
0.8 g K2PO4/kg bw. and day (Total dose including phosphate contained in basic low phosphate feed. Control animals received standard feed.) Vehicle: unchanged (no vehicle) Exposure: First experiment: 38 weeks Second experiment 14 weeks (daily) Dietary administration over 38 or 14 weeks, Limited clinical and biochemical investigations in vivo and some biopisies. Detailed kidney pathology (light and electron microscpy) and immunohistochemistry.		supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	Peddinghaus R, Bauer M, Lehmann H (1980b)
dog (Beagle) male subchronic (oral: gavage) See Table 1 Vehicle: water Exposure: up to 22 weeks (daily, see Table 1) Groups of 5 male Beagle dogs were given equimolar amounts of K2HPO4, Na2HPO4, KCl or NaCl daily by gavage over 9 or 22 weeks. After terminal sacrifice, the kidneys were investigated by light and electron microscopy.		2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	Schneider P, Ober K M and Ueberberg H (1981)
dog (Beagle) male/female subchronic (oral: feed) 0.3, 1.0 and 3.0% (nominal in diet) Male 94.55, 345.21 and 1038.77 mg/kg bw/day Female 118.66, 511.06 and 1460.76 mg/kg bw/day (Calculated using the mean of the weekly body weight and food consumption) Vehicle: unchanged (no vehicle) Exposure: 90 days (Continuous exposure in feed) A 90 day oral toxicity study was conducted with purebred beagle dogs fed Levn-Lite at dietary levels of 0.3,	NOAEL: > 1038.77 mg/kg bw/day (nominal) (male) based on: Calculated using the mean of the weekly body weight and food consumption (Based on no effects at highest dose level.) NOAEL: > 1460.76 mg/kg bw/day (nominal) (female) based on: Calculated using the mean of the weekly body weight and food consumption (Based on no effects at highest dose level.)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	Mastalski K (1972b)

Method	Results	Remarks	Reference
1.0 and 3.0%.			
dog (Beagle) male/female subchronic (oral: feed) 0, 3000, 10000 and 30000 ppm (nominal in diet) Equivalent to mean daily doses of 118, 317 and 1034 mg/kg/day for males (actual ingested) Equivalent to mean daily doses of 112, 361 and 1034 mg/kg/day for females. (actual ingested) Vehicle: corn oil Exposure: 26 weeks (1 - 1.5 hour feeding period per day) equivalent or similar to OECD Guideline 409 (Repeated Dose 90-Day Oral Toxicity in Non-Rodents)	NOAEL: ca. 1034 mg/kg bw/day (actual dose received) (male/female) (Occasional lower diet intakes by the treated females had no relevant effect on bw or other parameters.)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	Katz AC, Zwicker GM, Sauerhoff MW and Frank DW (1981)
sheep (Wether) subchronic (oral: feed) Exposure: 124 days (daily) The present study was undertaken to determine if the high incidence of calculi from the diet of wether is due to the potassium or the phosphorus in potassium acid phosphate fed at the rate of 11 g per pound of feed.		4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	Elam CJ, Schneider BH and Ham WE (1956)
sheep (wether) subchronic (oral: feed) monosodium phosphate: 2.52 and 2.55% (nominal in diet) disodium phosphate: 3.06% (nominal in diet) sodium tripolyphosphate: 2.52% (nominal in diet) dicalcium phosphate: 3.42% (nominal in diet) Exposure: 84 days (daily) One hundred eighty crossbred wether lambs were used in this		4 (not assignable) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Bushman DH, Emerick RJ & Embry LB (1965)

Method	Results	Remarks	Reference
experiment conducted during an 84-day period in the late summer and early fall. Rations consisted of the following: no added phosphorus (diets 1 and 5), monosodium phosphate (diet 2 and 6), disodium phosphate (diet 3 and 7), sodium tripolyphosphate (diets 4 and 8), and dicalcium phosphate (diet 9). Each treatment was replicated with 10 lambs per replication. All phosphorus supplements provided an additional 0.7% phosphorus in the concentrate portion of the ration, equivalent to 0.35% phosphorus in the complete air-dry ration. They were fed with two levels of calcium (0.31 and 0.58% of the air-dry ration), using ground limestone as the supplementary source, with the exception of dicalcium phosphate which was fed only with the higher calcium level due to the calcium content of this phosphorus source.			
dog (Beagle) male/female subchronic (oral: feed) 0, 3000, 10000 and 30000 ppm (nominal in diet) Equivalent to mean daily doses of 112, 390 and 1143 mg/kg/day for males (Calculated using the mean of the weekly body weight and food consumption) Equivalent to mean daily doses of 106, 323 and 1251 mg/kg/day for females (Calculated using the mean of the weekly body weight and food consumption) Vehicle: corn oil Exposure: 26 weeks (3 hour feeding period per day) U.S. F.D.A. Bureau of Foods 1982	NOAEL: 390 mg/kg bw/day (nominal) (male) based on: test mat. (Calculated using the mean of the weekly body weight and food consumption) (Body weight and histological findings at 1143 mg/kg bw/day) NOAEL: 323 mg/kg bw/day (nominal) (female) based on: test mat. (Calculated using the mean of the weekly body weight and food consumption) (Histological findings at 1251 mg/kg bw/day)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): phosphoric acid, aluminium sodium salt (See endpoint summary for justification of read-across)** Form: solid	Pettersen JC, Zwicker GM and Hackett DS (1987)
sheep (Merino) subchronic (oral: feed) 63% H3PO4 at 0.5, 1.5 and 3.0 g P/head/day (groups 5, 6 and 7 respectivelyl) (nominal in diet)		3 (not reliable) supporting study experimental result **Test material (EC name):**	McMeniman N.P. (1973)

Method	Results	Remarks	Reference
0.5 g /head/day and and increasing by 0.5 g per week to 3.0 g P/head/day (group 8) (nominal in diet) Exposure: 10 weeks (daily) 4 groups of 5 sheep received different doses of phosphoric acid via diet.		**orthophosphoric acid**	
cattle (Steers) (oral: feed) 52 mL (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 1 year, repeated on different animal during 3 years (one time per day) Feeding 8 lots of 8 steers each year during 3 years. Lot 1: with basic ration of ground milo grain, sumac silage, sillage and alfalfa hay. Lot 2: with basic ration of ground milo grain, sumac silage, sillage and alfalfa hay + Hyaluronidase Lot3: with basic ration of ground milo grain, sumac silage, sillage and alfalfa hay + ammonium chloride Lot 4: with basic ration of ground milo grain, sumac silage, sillage and alfalfa hay + phosphoric acid Lot 5: with basic ration of ground milo grain, sumac silage, cottonseed meal and alfalfa hay. Lot 6: with basic ration of ground milo grain, sumac silage, cottonseed meal and alfalfa hay+hyaluronidase Lot 7: with basic ration of ground milo grain, sumac silage, cottonseed meal and alfalfa hay+ammonium chloride Lot 8: with basic ration of ground milo grain, sumac silage, cottonseed meal and alfalfa hay+phosphoric acid		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Crookshank H.R, Keating F.E, Burnett E, Jones J.H, Davis R.E (1960)
rat male subchronic (oral: feed) 0.0% , 0.2% , 2.0% , 10.0%		3 (not reliable) disregarded study read-across from	Hodge HC (1956) Summaries published by BIBRA (1964)

Method	Results	Remarks	Reference
(nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 28 days (daily in feed) not applicable		supporting substance (structural analogue or surrogate) **Test material (EC name): disodium hydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: solid	
rat (Wistar) female subacute (oral: feed) 100 mmol phosphorus/kg diet, equivalent to 640 mg/kg bw/day potassium dihydrogenorthophosphate (assuming an average rat weight of 140g) (nominal in diet) 397 mmol phosphorus /kg diet, equivalent to 4404 mg/kg bw/day potassium dihydrogenorthophosphate (assuming an average rat weight of 140g) (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 21 days (The rats were given free access to the assigned diet and demineralized water throughout the experimental period.) Rats were fed on a diet containing potassium dihydrogenorthophosphate or pentapotassium triphosphate at the normal phosphorus level or at a high phosphorus level for 21 d. Feces and urine were collected on days 17-20 by use of metabolic cages. After the treatment, the animals were sacrificed, blood was obtained by exsanguination and the kidneys were removed. One kidney, feces and urine samples were ashed and analyzed for calcium, magnesium and phosphorus. Further urinalysis was also conducted. The other kidney was examined histopathologically and stained with Von Kossa stain to detect renal calcification.	no NOAEL identified: (No concentration-dependent dosing regimen was used.)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): potassium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Matsuzaki H, Masuyama R, Uehara M, Nakamura K, Suzuki K (2001)

Method	Results	Remarks	Reference
rat (Wistar) female subacute (oral: feed) no data Vehicle: Semisynthetic feed containing 30% cornstarch, 35% sucrose, 13% corn oil, complete vitamin mix, a Ca-P-deficient salt mix and either 15 or 25% casein. Exposure: EXPERIMENT I: 6 weeks EXPERIMENT II: 4-6 weeks; Reversibility test: 5 weeks with subsequent 8 weeks follow up on control feed. (Test diets were supplied to the animals ad libitum.) EXPERIMENT I: Groups of eight weanling female rats were fed for 6 weeks a semisynthetic diet containing Ca(H2PO4)2 and NaH2PO4 at concentrations of 0.5% Ca, 1% P and 25% casein as protein source. At the same time, the control group was fed with a standard rodent laboratory chow ("Purina chow", containing 1% Ca and 0.72% P). After 6 weeks the rats were killed and whole kidney Ca and P concentrations were determined. EXPERIMENT 2: The effect of protein concentration in semisynthetic diet was investigated. In all cases, the dietary Ca and P concentrations were 0.5% and 1%, respectively. Weanling rats were fed either a 15 or 25% casein containing diet for 4-6 weeks and then killed. Two other groups were fed the low- or high-protein diets for 5 weeks and then placed on standard rodent laboratory ("Purina") chow for a further 8 weeks to test the reversibility of the renal lesions.		3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Hitchman AJ, Hasany SA, Hitchman A, Harrison JE, Tam C (1979)
rat (Wistar) subacute (oral: feed) 3.4-12 g/kg bw/day (nominal in diet) Vehicle: milk Exposure: ranging from 7 h to 42		3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate)	McFarlane D (1941)

Method	Results	Remarks	Reference
days (daily) 15 Wistar rats were fed with sodium dihydrogenorthophosphate in milk at doses ranging from 3400-12000 mg / kg bw / d. The animals were killed at periods ranging from 7h to 42 days. Kidneys were fixed in formalin solution and examined macroscopically and microscopically.		**Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	
rat (Sprague-Dawley) male subchronic (oral: feed) 10g food/day containing 0.5, 1, or 2% phosphorus, equivalent with 0.04g/0.01g, 0.08g/0.02g, or 0.16g/0.04g NaH2PO4/Na2HPO4 per day, respectively. (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: 18 weeks (daily) To evaluate the mechanism by which phosphate induces renal injury, uninephrectomized, partially nephrectomized, and intact rats were placed on dietary phosphorus intakes of 0.5, 1.0, and 2.0% for 18 weeks. Blood samples were obtained every 3 weeks and analyzed for creatinine, calcium, and phosphorus. 7 weeks after beginning, 24h urine samples were collected using metabolic cages and analyzed for volume, creatinine, calcium, and phosphorus. After 18 weeks, animals were weighed, invasive arterial blood pressure was measured before the animals were exsanguinated. The kidneys were removed and weighed, and a coronal section of each kidney was fixed for histology. The remainder of the kidney tissue was analyzed for calcium content. Kidney sections were stained with H&E, coded and examined for histological changes.	no NOAEL identified: (No control group was included to which a comparison could have been made.)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (Mixture): balanced phosphorus mixture (4 parts monobasic sodium phosphate, one part dibasic sodium phosphate) (See endpoint summary for justification of read-across)**	Haut LL, Alfrey AC, Guggenheim S, Buddington B, Schrier N. (1980)
rat male/female subchronic (oral: feed) 1.8%, 3%, 5% based on feed wet weight (nominal in diet) Vehicle: unchanged (no vehicle)	no NOAEL identified: (Documentation insufficient for NOAEL derivation.)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate)	Hahn F, Jacobi H, Seifen E. (1958)

Method	Results	Remarks	Reference
Exposure: 6 month (no data) Male rats were fed with a diet containing different forms of phosphate (disodium hydrogenorthophosphate, tetrasodium pyrophosphate, pentasodium triphosphate) in different concentrations (1.8%, 3%, 5%) for 6 months. Animal weight and food consumption were recorded and at the end of the treatment period hematology and histopathology examination of selected organs were performed. Furthermore, whole animals were used to determine phosphorus, iron, calcium, and copper level.		**Test material (EC name): disodium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	
rat (Wistar) male/female chronic (oral: feed) 0.5%, 1.0%, 2.5%, 5.0% test material in diet (nominal in diet) Vehicle: unchanged (no vehicle) Exposure: Lifetime and a subchronic study of 12 weeks was also included. (Ad libitum) no data	NOAEL: 0.5 % based on: in diet LOAEL: 1 % in diet (male) based on: in diet (Based on reduced growth, kidney and liver weights effects in males)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (mixture): 33% Potassium phosphate and 67% of a mixture of tetrasodium phosphate and disodium phosphate (See endpoint summary for justification of read-across)**	Van Esch GJ, Vink HH, Wit SJ and Van Genderen H. (1957)
dog (Beagle) male subchronic (oral: gavage) 2080 mg/kg bw/day; in weeks 2-9, only half the dose was applied (nominal in diet) Vehicle: water Exposure: 22 weeks; half of the dose groups (2 animals per group) was examined after 9 weeks of treatement (daily) 20 male beagle dogs divided into 4 groups were given equimolar amounts of disodium hydrogenphosphate, dipotassium	no NOAEL identified: (no concentration-dependent dosing regimen was used.)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): disodium hydrogenorthophosphate (See endpoint summary for justification of read-across)**	Schneider P, Ober KM, Ueberberg H. (1981)

Method	Results	Remarks	Reference
hydrogenphosphate, sodium chloride, or potassium chloride daily by gavage over a period of 9 or 22 weeks. A further collective of 5 dogs served as control. After termination of the experiment, animals were killed and the kidneys were investigated by light- and electron microscopy. Clinical signs and mortality were routinely monitored.			
sheep (medium -wool Merino) male subchronic (It can be assumed that the supplements were given orally as the paper states that "The supplements were mixed with water and given as a daily drench.") 0.5, 1.5, 3.0 g calculated as phosphorus/sheep/day (actual ingested) 0.5g calculated as phosphorus/sheep/day, increasing by 0.5g per week to 3.0g phosphorus/sheep/day. Vehicle: water Exposure: 10 weeks (70 days) (daily) Male merino sheep were exposed to different sources of phosphate (mono sodium phosphate, phosphoric acid, bone flour) for 10 weeks. Their weight was recorded every week. Specimens of lung, liver, kidney, , spleen, heart, rumen, abomasum and large intestine were collected from any animals that died. They were fixed in 10% formalin and examined for histological changes.	no NOAEL identified: (male) (No effects on body weight significantly different from control animals were observed.)	3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: solid	McMeniman NP (1973)
rabbit female subchronic (oral: drinking water) 300-700 mg/kg bw in increasing doses (nominal in water) Vehicle: water Exposure: 5-16 month (no data) Female rabbits were exposed to sodium dihydrogenorthophosphate at 300-700 mg/kg bw in drinking water for 5 – 16 month. Subsequently the animals were sacrificed and the		3 (not reliable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Fazekas IG (1954)

Method	Results	Remarks	Reference
parathyroid glands were weighed, and histopathologically examined. 50 untreated animals served as controls.			
see below for abstract		4 (not assignable) disregarded study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sodium dihydrogenorthophosphate (See endpoint summary for justification of read-across)**	Ivy RE, Sullivan TW, Goldner WJ, Graff CR & Peo FR (1972)

5.6.1.2. Repeated dose toxicity: inhalation

The results of studies on repeated dose toxicity after inhalation exposure are summarised in the following table:

Table 24. Studies on repeated dose toxicity after inhalation exposure

Method	Results	Remarks	Reference
rat chronic (inhalation: aerosol) 10.6 mg/m3 (concentration per P2O5) Exposure: No data (No data) Chronic inhalation of hydro-aerosol of phopshoric acid in a concentration of 10.6 mg/m3 per P2O5.	no NOAEL identified:	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Sigova N.V. (1983)

Data waiving

Information requirement: Repeated dose toxicity after inhalation exposure

Reason: other justification

Justification: A key study is available for the oral route of exposure. According to the REACH Regulation, only one route of exposure should be tested for repeated dose toxicity (column 1, annex VIII, section 8.6.1). Therefore, it is not necessary to perform a repeated dose toxicity study via the inhalation route of exposure.

5.6.1.3. Repeated dose toxicity: dermal

Data waiving

Information requirement: Repeated dose toxicity after dermal administration

Reason: study scientifically unjustified

Justification: According to Annex VIII, Section 8.6.1, Column 2 and Annex IX, Section 8.6.2, Column 2 of Regulation No. 1907/2006 (REACH) testing by the dermal route is appropriate if 1) inhalation of the substance is unlikely, 2) skin contact in production and/or use is likely and 3) physiochemical and

toxicological properties suggest potential for a significant rate of absorption through the skin, and 4) one of the following conditions is met:

• Toxicity is observed in the acute dermal toxicity test at lower doses than in the oral toxicity test,

Or

• Systemic effects or other evidence of absorption is observed in skin and/or eye irritation studies,

Or

• In vitro tests indicate significant dermal absorption,

Or

• Significant dermal toxicity or dermal penetration is recognised for structurally-related substances.

Orthophosphoric acid is corrosive to the skin and therefore skin contact in production and/or use is unlikely due to risk management measures already in place and consumers are not expected to be in contact with pure orthophosphoric acid. There is no evidence of any acute dermal toxicity for any analogous substances (e. g. sodium or potassium salts of orthophosphoric acid) nor is there any evidence to suggest that these substances have the ability to be dermally absorbed in significant quantities. As phosphoric acid is corrosive to skin, any skin damage might enhance penetration of the substance. However, it is generally accepted that the dermal absorption will not be higher compared to the oral absorption. As column 1 of section 8.6.1 also states that the 'study should be performed via the most appropriate route of administration, having regard or the likely route of human exposure' it is considered that a study conducted via the dermal route of exposure would not be the most appropriate.

Furthermore, in accordance with Annex XI, Section 2 (testing is not technically possible) as orthophosphoric acid corrosive it is unlikely that dose levels in the range of interest for repeated dose toxicity could be prepared as analogous substances are generally recognised as being of low toxicity over normal dose ranges.

Based on the rationale above and taking into consideration that oral exposure represents a worst-case scenario for systemic uptake. No further testing for repeated dose toxicity via the dermal route is considered to be scientifically justified.

5.6.1.4. Repeated dose toxicity: other routes

No relevant information available

5.6.2. Human information

The exposure-related observations in humans are summarised in the following table:

Table 25. Exposure-related observations on repeated dose toxicity in humans

Method	Results	Remarks	Reference
Study type: biological effect monitoring Endpoint addressed: repeated dose toxicity: oral	No ill effects have been observed during the experiment. The proacted ingestion of the highest dose of phosphoric acid (3.16 g) was felt as a strain. For the 2.37g dose of phosphoric acid given daily for one week to four men: Phosphoric acid is excreted in the urine with the aid of some reduction of the pH, an increase in the titrable acidity and a slight increase in preformed urinari ammonia. No significant changes in the CO2 combining capacity of the plasma, indicating metabolic acidosis, were found, nor were significant variations observed in the urinary excretion of potassium	2 (reliable with restrictions) supporting study **Test material (EC name): orthophosphoric acid**	Malm O J (1952)

Method	Results	Remarks	Reference
	and total fixed bases. For the 3.16g dose phosphoric acid given daily for four weeks to 2 men: Phosphoric acid reduce the urinary calcium slightly in the one, somewhat more markedly in the other case. The calcium balance remained unchanged by phosphoric acid administration in both cases. For the 0.8g dose phosphoric acid given daily for eight week to 4 men: No effect on the calcium balances.		
Study type: long-term dietary study Details on study design: Long-term dietary data from 3-d weighed dietary records collected by 228 healthy children and adolescents enrolled in the DONALD Study in 4 y of study participation were used for data analysis. Variables of bone modeling and remodeling of the radius were assessed by using peripheral quantitative computed tomography. Endpoint addressed: repeated dose toxicity: oral	Long-term consumption of caffeinated soft drinks was negatively associated with polar strength strain index ($P < 0.01$) and periosteal circumference ($P < 0.05$), which reflect bone modeling. Milk intake was positively associated with polar strength strain index ($P < 0.05$). One difference between caffeinated and uncaffeinated soft drinks is the type of acidulant added, ie, phosphoric acid in caffeinated soft drinks. Whereas the addition of phosphoric acid increases the potential renal acid load (PRAL) value of foods, addition of dietary organic acids which are metabolically oxidized to bicarbonate and water will not. Because in this publication adjustment was done for total PRAL, the phosphoric acid content of caffeinated soft drinks does not seem to be the reason for the differences in the effects of caffeinated and uncaffeinated soft drinks on bone variables.	3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Libuda L (2008)
Study type: Dietary study Details on study design: Consumption of 200-400 mg of phosphoric acid (equivalent 40-80 mg/kg BW) in fruit juices every day during 10-14 days by 17 volunteers. Endpoint addressed: repeated dose toxicity: oral	No observable change in urine composition indicating a disturbed metabolism.	3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Lauersen F (1952)
Details on study design: Four air samples for phosphoric acid were taken. Medical questionnaires were administered to 64	No serious health problems were detected. Air sampling: one personal sample (operator)	Not relevant supporting study	Chrostek W and Murphy DC (1984)

Method	Results	Remarks	Reference
workers. The questionnaires were distributed to all available salaried on three shifts and five production lines. Interviews with 12 employees were conducted. The selection for these interviews was based on type and frequency of reported symptoms (based on questionnaire) Endpoint addressed: repeated dose toxicity: inhalation	and one area sample were taken in the acid area. Both samples were less than the laboratory limit of quantitation (4 µg/sample).	**Test material (EC name): orthophosphoric acid**	
Endpoint addressed: repeated dose toxicity: inhalation	According to the review of Payne in toxicological information, the Renke et al, 1987 study state that, the health of workers was investigated in a phosphoric acid division type of process unspecified) of phosphate fertilizer plant. The incidence of bronchial and peribronchial changes was not clearly significantly greater than for non-exposed office staff in the same factory. No information on exposure concentration. No information on duratoin of exposure. No possibility to conclude about toxic effects of phosphoric acid from that study.	4 (not assignable) supporting study **Test material (EC name): orthophosphoric acid**	Renke W, Winnicka A, Graczyk M (1987)

5.6.3. Summary and discussion of repeated dose toxicity

Read-across and test material identity

The available studies are performed on sodium aluminium phosphate variants. These are referred to as KASAL, LEVN-LITE and LEVAIR are believed to have the following ratios (Kasal has been reported as having two different ratios and as such it is unclear as to which ratio is correct):

Test material name	Sodium	Aluminium	Phosphate
KASAL	15	3	8
KASAL	8	2	4
LEVAIR	1	3	8
LEVN-LITE	3	2	8

All available studies report the doses administered to the animals as either ppm or % in feed. As such and where the relevant information (e. g. bodyweights and food consumption) is available this has been converted to mg/kg bw/day.

Read-across justification and category hypothesis

This category covers inorganic salts of sodium or potassium and orthophosphoric acid.

In accordance with REACH Annex XI, Section 1.5, of Regulation (EC) No. 1907/2006 (REACH) the standard testing regime may be adapted in cases where a grouping or read-across approach has been applied.

The similarities may be based on:

(1) a common functional group

(2) the common precursors and/or the likelihood of common breakdown products via physical or biological processes, which result in structurally similar chemicals; or

(3) a constant pattern in the changing of the potency of the properties across the category

For orthophosphoric acid read-across from sodium and potassium orthophosphates is considered appropriate for the repeated-dose endpoint based on the following similarities between substances:

(1) All substances are ionic and share the PO43-anion as a common functional groups.

(2) All members of the group will ultimately dissociate into the common breakdown products of the Na+or K+cations (for sodium and potassium orthophosphates respectively) and the PO43-anion (all). Thus phosphoric acid is systemically bioavailable as phosphate.

Sodium aluminium phosphate is essentially a sodium orthophosphate that also contains an aluminium ion. Although aluminium is known to have toxic effects, no evidence of aluminium toxicity was observed in any of the studies. The addition of aluminium in the phosphate compound is unlikely to have an impact on the use of this data for the sodium and potassium phosphates as any toxicity observed is considered to be due to the phosphate content of the test material; renal effects (nephrocalcinosis) indicative of high phosphate intake were the only toxic effects noted in the studies. Therefore the results of the tests performed with sodium aluminium phosphate can reliably be read across to orthophosphoric acid. This conclusion is further supported by the data on a number of analogous substances which suggests potassium and sodium orthophosphates and orthophosphoric acid itself are not considered to be systemically toxic.

In accordance with the provisions set out in Annex XI, Section 1.5, the results of the studies used for assessment and read-across are adequate for the purpose of classification and labelling and/or risk assessment; have adequate and reliable coverage of the key parameters addressed in the corresponding test method; cover an exposure duration comparable to or longer than the corresponding test method; and adequate and reliable documentation of the applied method is provided in the technical dossier. No further testing is proposed.

Choice of study

Ten studies on sodium aluminium were available. For three of these studies there was insufficient information to allow calculation of the dosage in mg/kg bw/day. One report was discounted as only male animals were tested at two dose levels. Another was discounted as only female animals were tested and no information on food consumption was provided in the report. The remaining seven studies were considered when assigning the key study for derivation of DNELs. They were as follows:

Study reference	**Length of study**	**Test species**	**S: Al: P ratio**	**N(L) OAEL mg/kg bw/day**	**Comments**
Smith, 1972, BTL-71-49B	90 day	Rat	3:2:8 / Levn-lite	155 (LOAEL)	Nephrocalcinosis

Study reference	Length of study	Test species	S: Al: P ratio	N(L) OAEL mg/kg bw/day	Comments
Mastalski, 1972, BTL-71-49C	90 day	Dog	3:2:8 / Levn-lite	>1038.77 (NOAEL)	No effects at high dose
Smith, 1972, IBT B747 / PS-2751	90 day	Rat	1:3:8 / Levair	182.57 (LOAEL)	Microconcretions observed in the renal tubules of the female rats at all dose levels
Katz, 1981, T-10195 / PS-2947	6 month	Dog	1:3:8 / Levair	1034 (NOAEL)	No effects at high dose
Smith, 1962, IBT B747/PS-2807	90 day	Rat	Kasal	172.66 (LOAEL)	Micro concretions observed in the renal tubules of the female rats at all 3 dose levels
Mastalski, 1972, IBT J749 /PS-2934 (KS inhalation)	90 day	Dog	Kasal	322.88 (NOAEL female) 492.77 (NOAEL male)	Increase in number of calcified micro concretions observed in kidneys of highest dose groups.
Pettersen, 1987, T-12969 / PS-2804	6 month	Dog	Kasal	390 (NOAEL male) 323 (NOAEL female)	Feed consumption and bodyweight changes in males and mild tubular glomerolonephritis in high dose males. In the high dose females the brain aluminium concentration was increased by 1.6 times, but unchanged in the lower doses.

No trend with regards to toxicity effects as a result of the difference in the ratios of sodium, aluminium and

phosphate was noted in the results. The key effect was nephrocalcinosis and this has been shown to be as a result of high phosphate ingestion. The presence of an aluminium ion did not appear to have an effect on the results or the toxicity observed in the studies.

The lowest observed effect level based on nephrocalcinosis is lower than any of the reported no observed effect levels, therefore the oral DNEL is based on the 90 day study performed with levn-lite in the rat (Smith, 1973). AS nephrocalcinosis is assumed to be most relevant to the oral route the study selected for the derivation of the inhalation DNEL the lowest NOAEL based on non-kidney related effects. In this instance the NOAEL used is 323 mg/kg bw/day based on reduced bodyweight gain in the high dose group. The test animals were dogs (Pettersen,1987).

The following information is taken into account for any hazard / risk assessment:

Repeated dose toxicity: oral

Two key studies exist. Both studies are assigned a Klimisch 2 rating and have been selected as key studies for derivation of DNELs.

Repeated dose toxicity: dermal

No reliable data were available for the dermal route of exposure. Therefore, testing via this exposure route is waived according to column 2 adaptation.

Repeated dose toxicity: inhalation

No reliable data were available for the inhalation route of exposure. Therefore, testing for this exposure route is waived based on column 2 adaptation.

Value used for CSA (via oral route - systemic effects):

Adverse effect observed (LOAEL: 155 mg/kg bw/day) (subchronic; rat)

Target organs: urogenital: kidneys

Value used for CSA (dermal - systemic effects):

No study available

Value used for CSA (dermal - local effects):

No study available

Value used for CSA (inhalation - systemic effects):

No study available

Value used for CSA (inhalation - local effects):

No study available

Justification for classification or non classification

Calcification of the kidneys is known to be an effect of long term exposure to relatively high doses of phosphates. These effects occur at dose levels well above the cut off for classification via the oral route in accordance with Regulation (EC) No. 1272/2008 (EU CLP) and therefore no classification is proposed.

5.7. Mutagenicity

5.7.1. Non-human information

5.7.1.1. In vitro data

The results of in vitro genotoxicity studies are summarised in the following table:

Table 26. In vitro genotoxicity studies

Method	Results	Remarks	Reference
bacterial reverse mutation assay (e.g. Ames test) (gene mutation)	Evaluation of results: negative	1 (reliable without restriction)	Thompson P W (2010)

Method	Results	Remarks	Reference
S. typhimurium TA 1535, TA 1537, TA 98 and TA 100 (met. act.: with and without) E. coli WP2 uvr A (met. act.: with and without) Test concentrations: Preliminary Toxicity Test: 0, 0.15, 0.5, 1.5, 5, 15, 50, 150, 500, 1500 and 5000 µg/plate main test: Experiment one: 50, 150, 500, 1500 and 5000 µg/plate Experiment two: 50, 150, 500, 1500 and 5000 µg/plate Positive control substance(s): 2-Aminoanthracene: 1 µg/plate Positive control substance(s): 2-Aminoanthracene: 2 µg/plate Positive control substance(s): 2-Aminoanthracene: 2 µg/plate Positive control substance(s): 2-Aminoanthracene: 10 µg/plate Positive control substance(s): benzo(a)pyrene (Benzo(a)pyrene: 5 µg/plate) Positive control substance(s): 4-nitroquinoline-N-oxide (4-Nitroquinoline-1-oxide: 0.2 µg/plate) Positive control substance(s): 9-aminoacridine (9-Aminoacridine: 80 µg/plate) Positive control substance(s): N-ethyl-N-nitro-N-nitrosoguanidine (N-ethyl-N'-nitro-N-nitrosoguanidine: 3 µg/plate) Positive control substance(s): N-ethyl-N-nitro-N-nitrosoguanidine (N-ethyl-N'-nitro-N-nitrosoguanidine: 5 µg/plate) Positive control substance(s): N-ethyl-N-nitro-N-nitrosoguanidine (N-ethyl-N'-nitro-N-nitrosoguanidine: 2 µg/plate) OECD Guideline 471 (Bacterial	Test results: negative for E. coli WP2 uvr A(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: no (Tested up to maximum recommended dose of 5000 µg/plate) ; vehicle controls valid: yes; negative controls valid: yes; positive controls valid: yes negative for S. typhimurium TA 1535, TA 1537, TA 98 and TA 100(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: no, but tested up to limit concentrations (Tested up to maximum recommended dose of 5000 µg/plate) ; vehicle controls valid: yes; negative controls valid: yes; positive controls valid: yes	key study experimental result **Test material (EC name): orthophosphoric acid** Form: viscous	

Method	Results	Remarks	Reference
Reverse Mutation Assay) EU Method B.13/14 (Mutagenicity - Reverse Mutation Test Using Bacteria) JAPAN: Guidelines for Screening Mutagenicity Testing Of Chemicals equivalent or similar to EPA OPPTS 870.5100 - Bacterial Reverse Mutation Test (August 1998) (Meets the requirements of the Japanese Regulatory Authorities including METI, MHLW and MAFF, OECD Guidelines for Testing of Chemicals No. 471 "and the USA, EPA (TSCA) OPPTS harmonised guidelines.)			
mammalian cell gene mutation assay (gene mutation) mouse lymphoma L5178Y cells (met. act.: with and without) Test concentrations: 0, 61.25, 122.5, 245, 490, 735 and 980 µg/mL Positive control substance(s): ethylmethanesulphonate Positive control substance(s): cyclophosphamide equivalent or similar to OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test) equivalent or similar to EU Method B.17 (Mutagenicity - In Vitro Mammalian Cell Gene Mutation Test)	Evaluation of results: negative Test results: negative (4-hour exposure with and without metabolic activation) for mouse lymphoma L5178Y cells(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: yes (very modest dose-related toxicity. No evidence of any reductions in viability (%V), therefore no residual toxicity occurred.) ; vehicle controls valid: yes; negative controls valid: not applicable; positive controls valid: yes negative (24-hour exposure without metabolic activation) for mouse lymphoma L5178Y cells(all strains/cell types tested) ; met. act.: without ; cytotoxicity: yes (modest dose-related toxicity following exposure to the test material. There was no evidence of any reductions in viability (%V), therefore indicating that no residual toxicity had occurred.) ; vehicle controls valid: yes; negative controls valid: not applicable; positive controls valid: yes	1 (reliable without restriction) key study experimental result **Test material (EC name): orthophosphoric acid** Form: viscous	Brown RW (2010)
bacterial reverse mutation assay	Evaluation of results:	2 (reliable with	Cipollaro M,

Method	Results	Remarks	Reference
(e.g. Ames test) (gene mutation) S. typhimurium, other: TA100, TA97, TA102, TA98, and TA1535 tester strains (met. act.: with and without) Test concentrations: Buffer solutions of the test substance ranging in pH from 4 to 9. Positive control substance(s): sodium azide Positive control substance(s): daunomycin Positive control substance(s): methylmethanesulfonate equivalent or similar to OECD Guideline 471 (Bacterial Reverse Mutation Assay)	negative Test results: negative for S. typhimurium, other: TA100, TA97, TA102, TA98, and TA1535 tester strains(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: yes (The acidification of incubation mixture to pH 5.0 produced toxic effects on bacteria as the appearance of survivors suggested; at lower pH values, complete bacterial death was observed. Values between 5.5 and 9.0 do not exert significant effects.) ; vehicle controls valid: not applicable; negative controls valid: yes; positive controls valid: yes	restrictions) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Corsale G, Esposito A, Ragucci E, Staiano N, Giordano (1986)
bacterial reverse mutation assay (e.g. Ames test) (gene mutation) S. typhimurium, other: TA97, TA98, TA100, TA104 (met. act.: with and without) Test concentrations: 0, 0.5, 1.00, 2.00 µg/plate Positive control substance(s): 2-aminoanthracene (2-AA) equivalent or similar to OECD Guideline 471 (Bacterial Reverse Mutation Assay)	Evaluation of results: negative Test results: negative for S. typhimurium, other: TA97, TA98, TA100, TA104(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: no (Routine examination of the bacterial background lawn indicates the absence of toxicity associated with the doses of the compounds tested) ; vehicle controls valid: not applicable; negative controls valid: yes; positive controls valid: yes	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Al-Ani Farouk Y and Al-Lami salah K. (1988)
bacterial reverse mutation assay (e.g. Ames test) (gene mutation) S. typhimurium, other: TA98, TA100, TA1535, TA1537 and Escheria coli WP2uvrA (met. act.: with and without) Test concentrations: 156.3, 312.5, 625, 1250, 2500, 5000 µg/plate equivalent or similar to OECD Guideline 471 (Bacterial Reverse Mutation Assay)	Evaluation of results: negative Test results: negative for S. typhimurium, other: TA97, TA98, TA1535, TA1537 and Escherichia coli WP2uvrA(all strains/cell types tested) ; met. act.: with and without ; vehicle controls valid: yes; negative controls valid: not applicable; positive controls valid: yes	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Choi S.A, Hong E.K (2008)
bacterial gene mutation assay (gene mutation)	Evaluation of results: negative	3 (not reliable) disregarded study	Demerec M, Bertani G, Flint J (1951)

Method	Results	Remarks	Reference
E. coli, other: B/Sd-4/1, 3, 4, 5 and B/Sd-4/3,4 (met. act.: without) Test concentrations: 0.008%, 0.010%	Test results: negative for E. coli, other: B/Sd-4/1, 3, 4, 5 and B/Sd-4/3,4(all strains/cell types tested) ; met. act.: without ; cytotoxicity: not determined ; vehicle controls valid: not examined; negative controls valid: not examined; positive controls valid: not examined	experimental result **Test material (EC name): orthophosphoric acid**	
in vitro mammalian chromosome aberration test (chromosome aberration) lymphocytes: human (met. act.: with and without) Test concentrations: The purity of the test item was 85% and was accounted for in the test item formulation. Preliminary Test: 0, 3.83, 7.67, 15.31, 30.63, 61.25, 122.5, 245, 490, 980 µg/mL Experiment 1: 0, 30.63, 61.25, 122.5, 245, 490, 980 µg/mL Experiment 2: 0, 15.31, 30.63, 61.25, 122.5, 245, 490, 980 µg/mL Positive control substance(s): mitomycin C;cyclophosphamide OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test) EU Method B.10 (Mutagenicity - In Vitro Mammalian Chromosome Aberration Test) EPA OPPTS 870.5375 - In vitro Mammalian Chromosome Aberration Test JAPAN: Guidelines for Screening Mutagenicity Testing Of Chemicals	Evaluation of results: negative Test results: negative for lymphocytes: human(all strains/cell types tested) ; met. act.: with and without ; cytotoxicity: no ; vehicle controls valid: yes; negative controls valid: not applicable; positive controls valid: yes	1 (reliable without restriction) key study experimental result **Test material (EC name): orthophosphoric acid**	Lacey FE (2013)
in vitro mammalian chromosome aberration test (chromosome aberration) mammalian cell line, other: Chinese Hamster Lung (CHL/IU) (met. act.: with and without) Test concentrations: 112.5, 225.0	Evaluation of results: negative Test results: negative for mammalian cell line, other: Chinese Hamster Lung (CHL/IU)(all strains/cell types tested) ; met. act.: with	1 (reliable without restriction) supporting study experimental result **Test material (EC name):**	Kim S.H, Lee B.K (2005)

Method	Results	Remarks	Reference
and 450.0 µg/mL Positive control substance(s): mitomycin C (0.05 µg/mL) Positive control substance(s): mitomycin C (0.05 µg/mL) Positive control substance(s): benzo(a)pyrene (20 µg/mL) OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)	and without ; cytotoxicity: yes ; vehicle controls valid: yes; negative controls valid: yes; positive controls valid: yes	**orthophosphoric acid**	

5.7.1.2. In vivo data

Data waiving

Information requirement: In vivo genotoxicity

Reason: study scientifically unjustified

Justification: No reliable data were available on the genetic toxicity in vivo endpoint. Phosphoric acid tested negative in in vitro toxicity tests (Ames test, mammalian chromosome aberration test, mouse lymphoma assay) and therefore in accordance with Annex IX, section 8.4, column 2 of Regulation (EC) No. 1907/2006 (REACH) no in vivo mutagenicity tests should be performed with this substance.

5.7.2. Human information

No relevant information available

5.7.3. Summary and discussion of mutagenicity

The substance has no structural alerts for mutagenicity. In addition, in vitro studies performed on the substance were GLP compliant, performed according to recommended guidelines and were of a high quality (Klimisch = 1). It is therefore considered that these results are applicable to humans. No further testing is required.

The following information is taken into account for any hazard / risk assessment:

THe following studies were performed and all showed the test material to be clearly negative both with and without metabolic activation.

Bacterial reverse mutation assay (Ames test) - OECD TG 471

Chromosome Aberration Test in Human Lymphocytes in vitro - OECD TG 473

Mammalian cell gene mutation assay in vitro (mouse lymphoma assay) - OECD TG 476

Value used for CSA: Genetic toxicity: No adverse effect observed (negative)

Justification for classification or non classification

Phosphoric acid was found to be negative in all available in vitro gene mutation tests and therefore, the substance should not be classified for mutagenicity.

5.8. Carcinogenicity

5.8.1. Non-human information

5.8.1.1. Carcinogenicity: oral

No relevant information available

5.8.1.2. Carcinogenicity: inhalation

No relevant information available

5.8.1.3. Carcinogenicity: dermal

No relevant information available

5.8.1.4. Carcinogenicity: other routes

No relevant information available

5.8.2. Human information

The exposure-related observations in humans are summarised in the following table:

Table 27. Exposure-related observations on carcinogenicity in humans

Method	Results	Remarks	Reference
Study type: A retrospective cohort mortality study of phosphate fertilizer production workers was undertaken to determine whether this group is at increased risk of dying from any cause, particularly from lung cancer. Details on study design: The analysis was performed using a modified life table analysis program developed by NIOSH. Person years at risk of dying (PYARs) were calculated from the first date of employment at the plant through the end of study date (12/31/77), the date of death, or the date when the subject was lost to follow-up, whichever occurred first. PYARs were obtained for each sex, race, 5-yr age and calendar period groups. The expected deaths were calculated by multiplying the appropriate PYARs by the U.S. death rates specific for 5-yr age groups, 5-yr calendar periods, sex, race, and cause of death. The results were summed over the specific categories to obtain the total expected deaths for each cause. The findings were also stratified by duration of employment and length of follow-up. Length of follow up was intended to act as a surrogate measure for latency, and duration of employment as a surrogate measure for exposure in this study. Endpoint addressed: carcinogenicity	Author's conclusions: Overall, no statistically significant elevations in cause-specific mortality were observed for the entire study population. However, when the analysis was stratified by duration of employment, and length of follow-up, a statistically significant ($P < 0.05$) excess in lung cancer mortality was observed among workers with more than 10 yr of employment and follow-up (standardized mortality ratio = 411). Because of the small number of deaths involved, and because we had prior knowledge of a lung cancer cluster at this plant, we believe that these findings should be viewed as suggestive, and that other investigations in plants with similar exposures are needed to clarify whether an occupationally related lung cancer excess truly exists.	Not relevant supporting study **Test material: >>>??? ID missing in IUCLID<<<**	Stayner LT, Meinhardt T, Lemen R , Bayliss D, Herrick R, Reeve G, (1985)
Study type: All workers employed by the participating phosphate company between 1950 and 1979 were ascertained, and 3451 males employed for approximately 6 months or more comprise the study population. Study population was evaluated with respect to cancer incidence.	there was a statistically significant increase in cancer deaths observed in ‘white’ workers (of the 346 deaths involved, 86 were due to cancer, with a standardised mortality ratio (SMR) of 1.26 (95% confidence interval 1.01-1.56)),	Not relevant supporting study **Test material: >>>??? ID missing in IUCLID<<<**	Block G, Matanoski GM, Seltser R & Mitchell T (1988)

Method	Results	Remarks	Reference
Endpoint addressed: carcinogenicity	but not in 'black' workers (26/127 deaths, SMR 0.93, 95% CI 0.61-1.36), employed in a Florida phosphate company for at least 6 months between 1950 and 1979 (the cohort was followed through to 1981). This was largely due to an increased incidence of respiratory tract cancer deaths (39 'white' workers died, SMR 1.62; 37 from lung cancer and two from laryngeal cancer). In workers employed for at least one year, lung cancer deaths increased with duration of employment. An SMR for lung cancer of 2.48 (95% CI 1.19-4.56) was seen in workers employed for at least 20 years (10 deaths). There was no evidence of excess lung cancer risk in employees hired after 1960.		

5.8.3. Summary and discussion of carcinogenicity

The following information is taken into account for any hazard / risk assessment:

No regulatory studies are available however the following documents discuss the possibility of phosphoric acid mist being carcinogenic via the inhalation route:

- IARC (1992). International Agency for Research on Cancer. Occupational exposure to mists and vapours from strong inorganic acids; and other industrial chemicals. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, volume 54. http: //monographs. iarc. fr/ENG/Monographs/vol54/mono54. pdf

- IARC (2012). International Agency for Research on Cancer. Chemical agents and related occupations. A review of human carcinogens. Mists from strong inorganic acids. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, volume 100F. http: //monographs. iarc. fr/ENG/Monographs/vol100F/mono100F-33. pdf

A full assessment of the available data has been performed and the conclusions are summarised under 'conclusions for classification or non-classification'.

Justification for classification or non classification

Conclusion on classification and labelling

In accordance with Regulation EC No.1272/2010 (EU CLP) phosphoric acid does not meet the criteria for classification as "carcinogenic to humans" for the following reasons:

1. There are no human studies on phosphoric acid that establish a causal relationship between exposure and the development of cancer. As such, a classification as Category 1A is not warranted.

2. There are no animal experiments that show evidence of phosphoric acid being a carcinogen. Therefore, a classification as Category 1B is not supported by the dataset.

3. There are no supporting data that would constitute 'limited evidence' of carcinogenicity for phosphoric acid. None of the studies report a positive association between exposure to phosphoric acid and cancer due to the lack of phosphoric acid specific data. For the reasons details above a causal interpretation based on acidity and alleged similarities to sulphuric acid does not appear credible and therefore Category 2 is not considered appropriate.

It is not advised to apply a 'precautionary' approach to classification based on the proposed classification for sulphuric acid since there is no proven mode-of-action or threshold for the proposed effects and it is not scientifically proven that any substance capable of causing respiratory irritation (due to low pH) is also a carcinogen. Furthermore, it would not be advisable to propose an animal study to investigate the mode of action. The OECD guideline for long-term carcinogenicity (OECD TG 451) focusses on exposure via the oral route, the guideline states that carcinogenicity studies via the inhalation route must be designed on a case-by-case basis. As reported in the OECD guideline for sub-chronic inhalation (OECD TG 413) it is possible to perform repeated-dose inhalation testing on dilutions of corrosive substances but it is stated that *'when exposing animals to these materials the targeted concentrations should be low enough to not cause marked pain and distress'.* Given that the hypothesized mode of action for phosphoric acid mist induced lung cancer revolves around the irritation effects it would be meaningless to perform a study to investigate dilutions of phosphoric acid that did not induce irritation. In addition, testing at higher concentrations would cause significant pain and distress to the test animals and a test protocol detailing such a method is unlikely to be acceptable to regulating authorities.

There is no regulatory requirement to perform animal testing to assess the risk and therefore no testing is proposed in accordance with the Regulation (EC) No 1272/2008 (EU CLP) and Regulation (EC) No 1907/2006 (REACH).

Please see attached report for further analysis.

5.9. Toxicity for reproduction

5.9.1. Effects on fertility

5.9.1.1. Non-human information

The results of studies on fertility are summarised in the following table:

Table 28. Studies on fertility

Method	Results	Remarks	Reference
rat (Sprague-Dawley) male/female screening oral: gavage 0, 125, 250 and 500 mg/kg Vehicle: water Exposure: The males were treated once daily during 2 weeks prior to mating, the 2 weeks of mating period, and 2 weeks after mating (total 6 weeks). The females of the main group were treated once daily from 2 weeks before mating to Day 4 post partum (approximately 54 days). The females of recovery group (without mating) were treated for approximately 54 days (applied equally main group females). Also, coitus was confirmed, but females did not show gestational signs, and were administrated until gestation Day 26. (Daily) OECD Combined Repeated Dose and Reproductive / Developmental Toxicity Screening Test (Precursor	NOAEL (F1): >= 500 mg/kg bw/day (male/female) (Reproductive and developmental toxicity: In the change of reproductive and developmental toxicity, effects of the test substance were not acknowledged in the mating, conception, parturition, and external of neonates, neonate body weights, and survival rate.)	1 (reliable without restriction) key study experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (2008)

Method	Results	Remarks	Reference
Protocol of GL 422)			
rat (Mus norvegicus) male/female three-generation study oral: feed First and second experiment: 0.05%; 0.15%; 0.40% H3PO4; separate experiment with 2nd generation: 0.75% H3PO4 (nominal in diet) Exposure: 29 weeks (No data) The reproduction of rats was investigated in different dietary groups.		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bonting SL (1952b)
rat (Albino rats) male/female three-generation study oral: feed 0.40 or 0.75% H3PO4 (nominal in diet) Exposure: The reproduction experiments of the rats in all groups was investigated when they were 32 weeks old and had received the diets for 29 weeks. The same animals were mated 11 weeks later. (No data) Experiments were carried out with rats over the whole life span and with successive generations in order to investigate the effect of phosphoric acid on reproduction.		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Bonting SL (1956)

Data waiving

Information requirement: Toxicity for reproduction / fertility

Reason: other justification

Justification: Although the standard requirement at the tonnage band of >1000 tonnes includes the extended one-generation reproductive toxicity test (EOGRTS, E. U Method B.56, OCED TG 443), the Intellegent Testing Strategy (ECHA Guidance document, Chapter R.7a: Endpoint specific guidance. Section 7.6.6) indicates that if sufficient data exist to permit a robust conclusion on reproductive toxicity then no further testing will be required. The currently available data for reproductive/developmental testing on phosphoric acid include: 1) Negative in vitro mutagenicity genotoxicity evidence (bacterial reverse mutation and in vitro Chromosomal Aberration and in vitro gene mutation in mammalian cells) suggests a low potential for germ-cell mutagenicity. 2) In an oral gavage study according to OECD 422 guideline (i. e., combined Repeat Dose/Reproductive-Developmental Toxicity test), phosphoric acid was administered to rats. No resulting reproductive or developmental effects were identified, nor were overall toxicological effects seen. A No-Observed Adverse Effects Level (NOAEL) for toxicity, reproduction and developmental effects was established at >500 mg/kg-bw/day. 3) An oral gavage study of monosodium phosphate in mice and rats, similar to OECD 414, showed no apparent effects on nidation (i. e., implantation of a fertilized egg in a uterus) or on maternal or fetal survival. There were no significant skeletal or soft tissue abnormalities

relative to sham-treated controls.

Toxicity to reproduction: other studies

No relevant information available

5.9.1.2. Human information

No relevant information available

5.9.2. Developmental toxicity

5.9.2.1. Non-human information

The results of studies on developmental toxicity are summarised in the following table:

Table 29. Studies on developmental toxicity

Method	Results	Remarks	Reference
rat (Wistar) oral: gavage 4.1, 19.0, 88.3 and 410.0 mg/kg (actual ingested) Vehicle: water Exposure: 10 days (Females were dosed beginning on day 6 through day 15 of gestation) (Daily) equivalent or similar to OECD Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEL (developmental toxicity): >= 410 mg/kg bw/day NOAEL (maternal toxicity): >= 410 mg/kg bw/day	2 (reliable with restrictions) key study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): Monosodium phosphate, anhydrous (See endpoint summary for justification of read-across)**	Bailey DE & Morgareidge K (1975)
mouse (CD-1) oral: gavage 3.2, 14.8, 68.9, 320.0 mg/kg (nominal in water) 3.7, 17.2, 79.7, and 370.0 mg/kg (actual ingested) Vehicle: water Exposure: 10 days (Females were dosed beginning on day 6 through day 15 of gestation) (Daily) equivalent or similar to OECD Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEL (developmental toxicity): >= 370 mg/kg bw/day NOAEL (maternal toxicity): >= 370 mg/kg bw/day	2 (reliable with restrictions) key study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): Monosodium phosphate, anhydrous (See endpoint summary for justification of read-across)**	Bailey DE & Morgareidge K (1975)

5.9.2.2. Human information

No relevant information available

5.9.3. Summary and discussion of reproductive toxicity

Effects on fertility

The currently available data for reproductive/developmental testing on phosphoric acid include: 1) Negative in vitro mutagenicity genotoxicity evidence (bacterial reverse mutation and in vitro Chromosomal Aberration) suggests a low potential for germ-cell mutagenicity. 2) In an oral gavage study according to OECD 422 guideline (combined Repeated Dose/Reproductive-Developmental Toxicity test), phosphoric acid was administered to rats. No resulting reproductive or developmental effects were identified, nor were overall toxicological effects seen. A No-Observed Adverse Effects Level (NOAEL) for toxicity, reproduction and developmental effects was established at >500 mg/kg-bw/day. 3) An oral gavage study of monosodium phosphate in mice and rats, similar to OECD 414, showed no apparent effects on nidation (i. e., implantation of a fertilised egg in a uterus) or on maternal or fetal survival. There were no significant skeletal or soft tissue abnormalities relative to sham-treated controls.

The following information is taken into account for any hazard / risk assessment:

The 54 days NOAEL, following oral exposure (gavage), for reproduction and fertility was > or = 500 mg/kg bw/day in male/female Sprague-Dawley rats. The test was performed according to OECD Guideline 422.

Value used for CSA (route: oral):

No adverse effect observed

Value used for CSA (route: dermal):

No study available

Value used for CSA (route: inhalation):

No study available

Developmental toxicity

The study included as key study under this endpoint was performed on the analogous substance. The justification for read-across is as follows:

In accordance with REACH Annex XI, Section 1.5, of Regulation (EC) No. 1907/2006 (REACH) the standard testing regime may be adapted in cases where a grouping or read-across approach has been applied.

The similarities may be based on:

(1) a common functional group

(2) the common precursors and/or the likelihood of common breakdown products via physical or biological processes, which result in structurally similar chemicals; or

(3) a constant pattern in the changing of the potency of the properties across the category

For orthophosphoric acid read-across from sodium and potassium orthophosphates is considered appropriate for the repeated-dose endpoint based on the following similarities between substances:

(1) All substances are ionic and share the PO43-anion as a common functional groups.

(2) All members of the group will ultimately dissociate into the common breakdown products of the Na+ or K+ cations (for sodium and potassium orthophosphates respectively) and the PO43-anion (all). Thus phosphoric acid is systemically bioavailable as phosphate.

The following information is taken into account for any hazard / risk assessment:

The 10 days NOAEL for maternal and developmental toxicity, following oral (gavage) exposure, in male/female

CD-1 mouse was > or = 370 mg/kg bw/day and in male/female Wistar rats was > or = 410 mg/kg bw/day. The test was performed according to a method similar to OECD Guideline 414 (with deficiencies).

Value used for CSA (route: oral)

No adverse effect observed NOAEL: 370 mg/kg bw/day (chronic; mouse)

Value used for CSA (route: dermal):

No study available

Value used for CSA (route: inhalation):

No study available

Justification for classification or non classification

Based on the available data and according to the criteria laid down in the Regulation (EC) No.1272/2008 (EU CLP), phosphoric acid should not be classified for reproductive or developmental toxicity.

5.10. Other effects

5.10.1. Non-human information

5.10.1.1. Neurotoxicity

No relevant information available

5.10.1.2. Immunotoxicity

No relevant information available

5.10.1.3. Specific investigations: other studies

No relevant information available

5.10.2. Human information

The exposure-related observations in humans (endpoint not specified or other) are summarised in the following table:

Table 30. Exposure-related observations: endpoint not specified or other

Method	Results	Remarks	Reference
Study type: treatment of hypoacid diathesis Endpoint addressed: not specified	Administration of 0.25 g/day of the dilute acid to babies and up to 26 g/day to adults reported did not cause adverse effects.	4 (not assignable) supporting study **Test material (EC name): orthophosphoric acid**	Ellinger RH (1972)
Study type: health record from industry Endpoint addressed: not specified	Exposition during 2.5 to 3 years of 46 men at the age of 33.3 +/- 8.4 years to inorganic phosphates during production of phosphoric acid did not indicate symptoms of affection.	4 (not assignable) supporting study **Test material (EC name): orthophosphoric acid**	Vyskocilova, Sindelka, Zapletal (1983)
Study type: case control study	Of the 57 children with serum	2 (reliable with	Mazariegos-

Method	Results	Remarks	Reference
(prospective) Details on study design: HYPOTHESIS TESTED (if cohort or case control study): Assess the hypothesis that the intake of at least 1.5 L/week of soft drinks containing phosphoric acid is a risk factor for the development of hypocalcemia in children METHOD OF DATA COLLECTION - Type: Interview of children and their mothers / other: short history and physical examination including measurement of height and weight. The presence of seizures or cramps was also determined. Blood examination was also performed - Details: The objective and hypothesis of the study were not told to the participating children or to their parents. In a masked and independent manner one of the researchers interviewed all the children and their mothers ot determine the number of bottles (1 bottle = 375 mL) of soft drink with phosphoric acid that they drank per week and to perform a directed short history and physical examination including measurement of height and weight. The presence of of seizures or cramps was also determined. STUDY PERIOD: no data SETTING: case/control ratio of 1:3; cases were defined as a serum Ca level less than 2.2 mmol/L (8.8 mg/dl), and controls as serum Ca levels of at least 2.2 mmol/L. The study was planned to include 51 cases and 153 controls, a number 10% higher than that required to meet the criteria: alfa = 0.05; power, 80%; frequency of exposure in the cases, 43% STUDY POPULATION - Total population: 209 potential subjects of which only 119 fulfilled the matching criteria, the rest of control subjects were sought among children matched for age and sex to cases laking controls. - Selection criteria: Children recruited from primary-care facilities were eligible only if they had been seen for healthy-child examinations, vaccination, minor trauma, or mild upper respiratory tract infections. Exclusion criteria: children with malnutrition, chronic diseases, or a history of having received drugs or other medical treatment within the past 3	Ca levels less than 2.2 mmol/L (8.8 mg/dL), 38 (66.7%) drank more than four bottles of soft drink per week, but only 48 (28%) of the 171 children with serum Calcium levels of at least 2.2 mmol/L did so (odds ratio = 5.27; 95% confidence interval, 3.17 to 8.75; $p < 0.001$). Four (7%) of the 57 sbujects in the case group and 1 (0.6%) of the 171 subjects in the control group had one or more episodes of seizures within the 3 months before the interview ($p < 0.02$). Cramps were present in 13 children (23%) in the case group and in eight (5%) of the control subjects ($p < 0.001$). For all 228 children, including case and control subjects in a single group, a significant negative correlation ($r = -0.41$; $p < 0.01$) between the serum Ca level and the number of bottles of soft drink consumed each week was found. In the 117 children that were followed up, basal serum Ca levels rose from 2.17 ± 0.25 mmol/L (8.7 ± 1.0 mg/dL) to 2.35 ± 0.15 mmol/L (9.4 ± 0.6 mg/dL; $p < 0.003$) and serum P levels dropped from 1.84 ± 0.42 mmol/L (5.7 ± 1.3 mg/dL) to 1.52 ± 1.9 mmol/L (4.7 ± 0.6 mg/dL; $p< 0.002$) 30 days after soft drink intake was discontinued.	restrictions) supporting study **Test material (EC name): orthophosphoric acid**	Ramos E, Guerrero-Romero F, Rodriguez-Moran M, Lazcano-Burciaga (1995)

Method	Results	Remarks	Reference
months were exlcuded from the study; children with a serum Ca concentration of at least 3.0 mmol/L (12.0 mg/dL) were excluded - Total number of subjects participating in study: 57 cases and 171 controls - Sex/age/race: children of either sex, 18 months to 14 years of age, were recruited from primary care facilities of the Mexican Institute of Social Security and from elementary schools belonging to the government educational system in the urban area of Durango. - Smoker/nonsmoker: not applicable - Total number of subjects at end of study: 228 - Matching criteria: for age matching, children aged 3 months more or less than the corresponding case were considered - Other: It was also possible to follow up 17 children (from oth case and control groups) who drank four or more bottoles of soft drink each week, who agreed to discontinue soft drink consumption and to have repeated measurements of serum Ca, Ps, and albumin 30 days later. COMPARISON POPULATION - Type: State registry / Regional registry / National registry / Control or reference group / Other comparison group: - Details: HEALTH EFFECTS STUDIED - Disease(s): - ICD No.: - Year of ICD revision: - Diagnostic procedure: - Other health effects: OTHER DESCRIPTIVE INFORMATION ABOUT STUDY: Endpoint addressed: not specified			
Study type: clinical case study Subjects: - Number of subjects exposed: 1 - Sex: male - Age: 42 years - Race: no data - Demographic information: no data - Known diseases: no data Endpoint addressed: not applicable		3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Cello JP, Fogel RP, Boland CR (1980)
Study type: poisoning incident		3 (not reliable)	Hawkins DB,

Method	Results	Remarks	Reference
Subjects: - Number of subjects exposed: 2 patients Endpoint addressed: not applicable		supporting study **Test material (EC name): orthophosphoric acid**	Demeter MJ, Barnett TE (1980)
Study type: clinical case study Subjects: - Number of subjects exposed: 1 - Sex: male - Age: 64 years old - Race: no data - Demographic information: no data - Known disease: The patients' medical history was significant for a gastectomy with Bilroth II anastomosis performed for peptic ulcer disease 23 years earlier - Other: no data Endpoint addressed: not applicable		3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Caravati EM (1987)
Endpoint addressed: not applicable		4 (not assignable) supporting study **Test material (EC name): orthophosphoric acid**	Arena JM (1970)

5.10.3. Summary and discussion of other effects

5.11. Derivation of DNEL(s) and other hazard conclusions

5.11.1. Overview of typical dose descriptors for all endpoints

Table 31. Available dose-descriptor(s) per endpoint as a result of its hazard assessment

Endpoint	Route	Dose descriptor or qualitative effect characterisation; test type	Reference to selected study (see footnotes for justification)
Acute toxicity	oral	Adverse effect observed LD50: 300 mg/kg bw	National Institute of Environmental Research (NIER), Korea (2005a) (see section 5.2.1.1)
Acute toxicity	dermal	No study available	
Acute toxicity	inhalation	No study available	
Irritation / Corrosivity	skin	Adverse effect observed corrosive	Warren N (2014c) (see section 5.3.1.1)
Irritation / Corrosivity	eye	Adverse effect observed corrosive	
Irritation / Corrosivity	respiratory tract	No study available	

Endpoint	Route	Dose descriptor or qualitative effect characterisation; test type	Reference to selected study (see footnotes for justification)
Sensitisation	skin	No study available	
Sensitisation	respiratory tract	No study available	
Repeated dose toxicity	oral	Adverse effect observed LOAEL: 155 mg/kg bw/day (subchronic; rat) Target organs: urogenital: kidneys	Smith PS (1972a) (see section 5.6.1.1)
Repeated dose toxicity	dermal (systemic effects)	No study available	
Repeated dose toxicity	dermal (local effects)	No study available	
Repeated dose toxicity	inhalation (systemic effects)	No study available	
Repeated dose toxicity	inhalation (local effects)	No study available	
Mutagenicity	in vitro / in vivo	No adverse effect observed (negative)	see section 5.7.1 / 5.7.2
Reproductive toxicity: effects on fertility	oral	No adverse effect observed	
Reproductive toxicity: effects on fertility	dermal	No study available	
Reproductive toxicity: effects on fertility	inhalation	No study available	
Reproductive toxicity: developmental toxicity	oral	No adverse effect observed	
Reproductive toxicity: developmental toxicity	dermal	No study available	
Reproductive toxicity: developmental toxicity	inhalation	No study available	

Justification for endpoint selection:

- Acute toxicity (oral): The WoE on the basis of all studies suggests that the LD50 falls within the range >300 < 2,000 mg/kg bw. The study selected is the one that supports this conclusion and was performed in accordance with the most current guideline.

- Acute toxicity (dermal): In accordance with Annex VIII, Section 8.5, Column 2 of Regulation No. 1907/2006 (REACH) an acute toxicity test does not need to be conducted if the substance is classified as corrosive to the skin. Phosphoric acid is classified as a skin corrosive (category 1B) and therefore the acute

Endpoint	Route	Dose descriptor or qualitative effect characterisation; test type	Reference to selected study (see footnotes for justification)

dermal study does not need to be conducted.

- Acute toxicity (inhalation): In accordance with Annex VIII, Section 8.5, Column 2 of Regulation No. 1907/2006 (REACH) an acute toxicity test does not need to be conducted if the substance is classified as corrosive to the skin. Phosphoric acid is classified as a skin corrosive (category 1B) and therefore the acute inhalation study does not need to be conducted.

- Irritation / Corrosivity (skin): The study that gives rise to the greatest concern is selected. Study is performed according to an appropriate guideline and under the conditions of GLP (Klimisch 1).

- Irritation / Corrosivity (eye): Not applicable - endpoint conclusion based on classification for skin corrosive effects and harmonised classification for eye damage.

- Sensitisation (skin): No study required due to the corrosivity of phosphoric acid.

- Repeated dose toxicity (oral): Selection reflects the lowest observed affect level in the most common test species.

- Mutagenicity: No study was selected since all three in vitro studies (Klimisch 1) were negative.

- Reproductive toxicity: effects on fertility (oral): No endpoint selected as conclusion based on the assessment of all available data.

- Reproductive toxicity: effects on fertility (dermal): An assessment of the reproductive toxicity via the oral route is made.

- Reproductive toxicity: effects on fertility (inhalation): An assessment of the reproductive toxicity via the oral route is made.

- Reproductive toxicity: developmental toxicity (oral): The endpoint record pertaining to the lowest NOAEL is selected. NOAEL is a greater than or equal to value.

- Reproductive toxicity: developmental toxicity (dermal): A study for developmental toxicity via the oral route is available.

- Reproductive toxicity: developmental toxicity (inhalation): A study for developmental toxicity via the oral route is available.

5.11.2. Selection of the DNEL(s) or other hazard conclusion for critical health effects

Table 32. Hazard conclusions for workers

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Inhalation	Systemic effects - Long-term	DNEL (Derived No Effect Level): 10.7 mg/m³	repeated dose toxicity (Oral)
Inhalation	Systemic effects - Acute	Hazard unknown (no further information necessary)	
Inhalation	Local effects - Long-term	Other toxicological threshold: 1 mg/m³	skin irritation/corrosion
Inhalation	Local effects - Acute	Other toxicological threshold: 2 mg/m³	skin irritation/corrosion

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Dermal	Systemic effects - Long-term	Hazard unknown (no further information necessary)	
Dermal	Systemic effects - Acute	Hazard unknown (no further information necessary)	
Dermal	Local effects - Long-term	Medium hazard (no threshold derived)	
Dermal	Local effects - Acute	Medium hazard (no threshold derived)	
Eyes	Local effects	Medium hazard (no threshold derived)	

Further explanation on hazard conclusions:

- **Inhalation Systemic effects - Long-term:** Although the leading health effect for phosphoric acid is considered to be corrosivity, a DNEL is calculated on the basis of repeated dose studies on analogous materials. This DNEL will not be used for risk assessment and is indicative only.

- **Inhalation Systemic effects - Acute:** The leading health effect for phosphoric acid is corrosivity. Whilst it is not anticipated that acute toxicity will occur via the inhalation route it is considered that the short-term exposure is controlled by the conditions applied as a result of the long-term exposure assessment.

- **Inhalation Local effects - Long-term:** In accordance with ECHA's Guidance on information requirements and chemical safety assessment Chapter R.8: Characterisation of dose [concentration]-response for human health, Appendix R8-13 when an EU IOEL exists a Registrant can use this value in place of deriving a DNEL. In accordance with Directive 2000/39/EC a European 8-hr Occupational Exposure Limit recommended by SCOEL is available for phosphoric acid and is 1 mg/m3 (8 hr TWA). This value is based on the Rushing observation on phosphorus pentoxide to the ACGIH TLV committee and is considered to be conservative.

- **Inhalation Local effects - Acute:** A DNEL for acute toxicity should be derived if an acute toxicity hazard (leading to C&L) has been identified and there is a potential for high peak exposures (REACH Guidance document R8, appendix R8 -8: Acute toxicity). The substance is not classified for acute exposure via inhalation. In addition, no peak exposure is warranted for this substance. In accordance with ECHA's Guidance on information requirements and chemical safety assessment Chapter R.8: Characterisation of dose [concentration]-response for human health, Appendix R8-13 when an EU IOEL exists a Registrant can use this value in place of deriving a DNEL. In accordance with Directive 2000/39/EC a European short-term Occupational Exposure Limit recommended by SCOEL is available for phosphoric acid and is 2 mg/m3 (15min STEL). This value is based on the Rushing observation on phosphorus pentoxide to the ACGIH TLV committee and is considered to be conservative.

- **Dermal Systemic effects - Long-term:** The leading health effect for phosphoric acid is corrosivity and therefore appropriate risk management measures to exclude dermal exposure are in place. In addition, in accordance with Guidance document R8, route-to-route extrapolation for the dermal route may not be appropriate for substances with a local mode of action with tissue damage is likely to be deoendentat on conentration and local effects rather than dose. A DNEL is therefore not required.

- **Dermal Systemic effects - Acute:** The leading health effect for phosphoric acid is corrosivity and therefore appropriate risk management measures to exclude dermal exposure are in place. In addition, in accordance with Guidance document R8, route-to-route extrapolation for the dermal route may not be appropriate for substances with a local mode of action with tissue damage is likely to be dependent on concentration and local effects rather than dose. A DNEL is therefore not required.

- **Dermal Local effects - Long-term:** As no quantitative route-specific data are available for phosphoric acid, no DNEL for local effects is proposed for workers and only an indication of the potency is given. As the substance is classified as corrosive to the skin category 1B, the substance is allocated to the "medium

Route	Type of effect	Hazard conclusion	Most sensitive endpoint

hazard" category according to the ECHA "Guidance on information requirements and chemical safety assessment Part E: Risk Characterisation Substances". As reported in the CLP Regulation No 1272/2008 Annex VI Table 3.1, the concentration limit for corrosivity of H3PO4 is 25%. The concentration range of 10 -25% is established for irritation, therefore calculation of a DNEL is not required due to protective measures already in place.

- **Dermal Local effects - Acute:** As no quantitative route-specific data are available for phosphoric acid, no DNEL for local effects is proposed for workers and only an indication of the potency is given. As the substance is classified as corrosive to the skin category 1B, the substance is allocated to the "Medium hazard" category according to the ECHA "Guidance on information requirements and chemical safety assessment Part E: Risk Characterisation Substances". As reported in the CLP Regulation No 1272/2008 Annex VI Table 3.1, the concentration limit for corrosivity of H3PO4 is 25%. The concentration range of 10 -25% is established for irritation, therefore calculation of a DNEL is not required due to protective measures already in place.

- **Eyes Local effects:** Hazard category assigned in accordance with table E.3-1 of ECHA's Guidance on the information requirements and chemical safety assessment. Part E: Risk Assessment.

Table 33. Further explanation on DNEL derivation for workers

Route / Type of effect	DNEL derivation	Assessment factors (AF) for DNEL derivation
Inhalation Systemic effects - Long-term	**DNEL derivation method:** ECHA REACH Guidance **Dose descriptor starting point:** NOAEC 534 mg/m³	**AF for difference in duration of exposure:** 2 (The assessment factor reflects the extrapolation from sub-chronic to chronic.) **AF for interspecies differences (allometric scaling):** (Not required as taken into account in the route-to-route extrapolation.) **AF for other interspecies differences:** 2.5 (Additional AF accounts for remaining differences.) **AF for intraspecies differences:** 5 (Standard assessment factor for workers.) **AF for the quality of the whole database:** 2 (Modified based on the reliability of alternative data, to account for the use of read-across data.) **AF for remaining uncertainties:** (No further assessment factor required. Route to route extrapolation already accounted for.) **Overall Assessment Factor:** 50
Inhalation Local effects - Long-term	**DNEL derivation method:** An appropriate OEL (8hr TWA) for phosphoric acid is in place and therefore a DNEL is not required.	
Inhalation Local effects - Acute	**DNEL derivation method:** An appropriate OEL (15min STEL) for phosphoric acid is in place and therefore a DNEL is not required.	

Route / Type of effect	DNEL derivation	Assessment factors (AF) for DNEL derivation

Justification for route-to-route extrapolation:

- **Inhalation Systemic effects - Long-term:** Route to route extrapolation is justified in the absence of test data for repeated dose toxicity via the inhalation route. The dose descriptor has been corrected using the equations on the left-hand side of Example R.8-2 of and methodology described in the ECHA Guidance, Chapter R.8. The starting descriptor was first corrected for differences in molecular weight and stoichiometry between SAlP and phosphoric acid. 1 mole SAlP results in 8 moles H3PO4 thus the dose descriptor is calculated using the following equation: N(L) OAEL(H3PO4) = N(L) OAEL(SAlP) *8*([Mol. Weight(H3PO4)]/[Mol. Weight(SAlP)]). The molecular weight of SAlP in this instance is 1185.57, molecular formula = Na15Al3(PO4)8.

Discussion

Choice of endpoint for DNEL derivation

the following issues were taken into account when deciding on which study to base the DNEL:

1. Nephrocalcinosis (in the form of microconcretions) was observed in the renal tubules of animals investigated in the tests. In general, rats; particularly female rats, are known to be susceptible when administered high doses of dietary phosphate (typically 0.5 -1.0% in the diet). Occupational exposure is not considered to contribute to such exposures and in addition healthy humans are considered to be less sensitive to calcium phosphate precipitation when compared to laboratory rats.

2. Nephrocalcinosis and/or reduced bodyweight gain were the only toxic effects observed in any of the studies.

3. The ratio of sodium, aluminium and phosphate in the test material appears to be less relevant to the toxicity endpoint (NOAEL) than feed consumption, body weight and dose levels. In all rat studies the N(L) OAEL was based on nephrocalcinosis. In two of the studies performed on dogs (standard alternative test species) the N(L) OAEL is the highest dose level tested. In the other two studies minimal nephrocalcinosis and reduced bodyweight was observed at the highest does resulting in the NOAEL being set at the mid dose level.

The LOAEL based on nephrocalcinosis (oral study, 90 days, rat) is lower than any of the reported NOAELs and as such this is used to derive the oral DNEL. As nephrocalcinosis is assumed to be relevant for dietary exposure the endpoints derived on the basis of this effect have no been taken into account for the inhalation route. In the studies where nephrocalcinosis was observed, there were no other forms of toxicity noted and as such it is considered acceptable to base the inhalation DNEL on on the lowest NOAEL. In this instance the NOAEL is taken from 90 day and 6 month studies in the dog and is based on reduced bodyweight gain at the highest dose.

Table 34. Hazard conclusions for the general population

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Inhalation	Systemic effects - Long-term	DNEL (Derived No Effect Level): 4.57 mg/m³	repeated dose toxicity (Oral)
Inhalation	Systemic effects - Acute	Hazard unknown (no further information necessary)	
Inhalation	Local effects - Long-term	DNEL (Derived No Effect Level): 0.36 mg/m³	skin irritation/corrosion
Inhalation	Local effects - Acute	Medium hazard (no threshold derived)	
Dermal	Systemic effects - Long-term	Hazard unknown (no further information necessary)	
Dermal	Systemic effects - Acute	Hazard unknown (no further information necessary)	
Dermal	Local effects -	Medium hazard (no threshold derived)	

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
	Long-term		
Dermal	Local effects - Acute	Medium hazard (no threshold derived)	
Oral	Systemic effects - Long-term	DNEL (Derived No Effect Level): 0.1 mg/kg bw/day	repeated dose toxicity (Oral)
Oral	Systemic effects - Acute	Low hazard (no threshold derived)	
Eyes	Local effects	Medium hazard (no threshold derived)	

Further explanation on hazard conclusions:

- **Inhalation Systemic effects - Long-term:** Phosphoric acid as such is not expected to become systemically available in the body. Once absorbed, phosphoric acid is distributed widely in the body as phosphate, which is an essential element to organisms and its metabolism in the human body is regulated. Phosphoric acid can be locally absorbed by ingestion, inhalation and dermal contact but is not expected to elicit a systemically toxic effect.

- **Inhalation Systemic effects - Acute:** The leading health effect for phosphoric acid is corrosivity. Whilst it is not anticipated that acute toxicity will occur via the inhalation route it is considered that the short-term exposure is controlled by the conditions applied as a result of the long-term exposure assessment.

- **Inhalation Local effects - Long-term:** A DNEL is derived from the OEL and takes into account the use of worker data for the general population (AF= 2). The differences in exposure duration, bodyweight and respiratory volume are accounted for in the assessment factor. As the OEL for phosphoric acid is based on the P2O5 concentration unlikely to cause irritation in workers an assessment factor of 2 is selected on the basis that the OEL can be directly applied to workers and the standard consumer assessment factor is half the worker assessment factor.

- **Inhalation Local effects - Acute:** A DNEL for acute toxicity should be derived if an acute toxicity hazard (leading to C&L) has been identified and there is a potential for high peak exposures (REACH Guidance document R8, appendix R8 -8: Acute toxicity). The substance is not classified for acute exposure via inhalation. In addition, no peak exposure to the general population is anticipated for this substance.

- **Dermal Systemic effects - Long-term:** The leading health effect for phosphoric acid is corrosivity and therefore appropriate risk management measures to exclude dermal exposure are in place. In addition, in accordance with Guidance document R8, route-to-route extrapolation for the dermal route may not be appropriate for substances with a local mode of action with tissue damage is likely to be dependent on concentration and local effects rather than dose. A DNEL is therefore not required.

- **Dermal Systemic effects - Acute:** The leading health effect for phosphoric acid is corrosivity and therefore appropriate risk management measures to exclude dermal exposure are in place. In addition, in accordance with Guidance document R8, route-to-route extrapolation for the dermal route may not be appropriate for substances with a local mode of action with tissue damage is likely to be dependent on concentration and local effects rather than dose. A DNEL is therefore not required.

- **Dermal Local effects - Long-term:** As no quantitative route-specific data are available for phosphoric acid, no DNEL for local effects is proposed for the general population and only an indication of the potency is given. As the substance is classified as corrosive to the skin category 1B, the substance is allocated to the “medium hazard category”, according to the ECHA “Guidance on information requirements and chemical safety assessment Part E: Risk Characterisation Substances”. A qualitative assessment based on classification limits for phosphoric acid and risk management will be performed.

- **Dermal Local effects - Acute:** Relevant data for the quantitative derivation of DNEL not available – in accordance with ECHA Guidance on Information Requirements and Chemical Safety Assessment. Part E:

Route	Type of effect	Hazard conclusion	Most sensitive endpoint

Risk Characterisation a qualitative assessment based on classification limits for phosphoric acid and risk management.

- **Oral Systemic effects - Long-term:** The DNEL is calculated from the most relevant study for the oral route (90-day exposure to rats). This DNEL does not take into account dietary exposure to phosphoric acid (as phosphates). Consumer uses of inorganic phosphates (with Na+, K+, Ca2+, Mg2+ and Al3+ cations), besides food and water, do not contribute noticeably to the oral intake of phosphates. Oral intake is predominately via food and water in the form of food additives or similar or from natural sources. It is therefore considered appropriate to use the Maximum tolerable daily intake (MTDI) value of 70 mg/kg bw /day of phosphorus as calculated by the Joint FAO/WHO Expert Committee on Food Additives (JEFCA) as any toxicity effects noted via the oral route are not attributable to the cation but are as a result of high doses of phosphates (see Section 7.5 of this dossier).

- **Oral Systemic effects - Acute:** A DNEL for acute toxicity should be derived if an acute toxicity hazard (leading to C&L) has been identified and there is a potential for high peak exposures (REACH Guidance document R8, appendix R8 -8: Acute toxicity). Phosphoric acid is classified as acutely toxic via the oral route, category 4 based on a limit test. However, as no peak oral exposure for the general population is anticipated for this substance no DNEL is calculated and low hazard has been selected to provide protection.

- **Eyes Local effects:** Hazard category assigned in accordance with table E.3-1 of ECHA's Guidance on the information requirements and chemical safety assessment. Part E: Risk Assessment.

Table 35. Further explanation on DNEL derivation for the general population

Route / Type of effect	DNEL derivation	Assessment factors (AF) for DNEL derivation
Inhalation Systemic effects - Long-term	**DNEL derivation method:** ECHA REACH Guidance **Dose descriptor starting point:** 457.42 mg/m³	**AF for difference in duration of exposure:** 2 (Key study is a 90-day Sub-chronic investigation. The assessment factor reflects the extrapolation from sub-chronic to chronic.) **AF for interspecies differences (allometric scaling):** (Not applicable - allometric scaling performed when deriving the starting dose.) **AF for other interspecies differences:** 2.5 (Additional AF accounts for remaining differences.) **AF for intraspecies differences:** 10 (Standard assessment factor for general population.) **AF for the quality of the whole database:** 2 (Modified based on the reliability of alternative data, to account for the use of read-across data.) **AF for remaining uncertainties:** (No further assessment factor required. Route to route extrapolation already accounted for.) **Overall Assessment Factor:** 100
Inhalation Local effects - Long-term	**DNEL derivation method:** OEL used as starting point for derivation of an exposure limit for the general population. An additional factor is applied to take into	**AF for dose response relationship:** (Not applicable - starting point is OEL) **AF for difference in duration of**

Route / Type of effect	DNEL derivation	Assessment factors (AF) for DNEL derivation
	account the differences in weekly exposure (worker = 5 days, consumer = 7 days). **Dose descriptor starting point:** OEL (8hr TWA)	**exposure:** (Not applicable - starting point is OEL and exposure time was accounted in the calculation) **AF for interspecies differences (allometric scaling):** (Not applicable) **AF for other interspecies differences:** (Not application) **AF for intraspecies differences:** 2 (Worker to general population - The value indicated for derivation of DNELs from a dataset is normally 10 however since the starting point is an occupational exposure limit for a local effect based on the P2O5 concentration unlikely to cause irritation in workers a factor of 10 would be considered unnecessarily restrictive. A factor of 2 is selected on the basis that the normal factor for the general population is twice that of the worker population.) **AF for the quality of the whole database:** (Not applicable) **AF for remaining uncertainties:** (Not applicable)
Oral Systemic effects - Long-term	**DNEL derivation method:** ECHA REACH Guidance **Dose descriptor starting point:** LOAEL	**AF for dose response relationship:** 3 (Starting dose is an LOAEL) **AF for difference in duration of exposure:** 2 (sub-chronic to chronic) **AF for interspecies differences (allometric scaling):** 4 (Standard allometric scaling - rat to human) **AF for other interspecies differences:** 2.5 (Default factor for remaining circumstances) **AF for intraspecies differences:** 10 (Standard assessment factor for general population) **AF for the quality of the whole database:** 2 (Modified to 2 to account for use of read-across data) **Overall Assessment Factor:** 1200

Justification for route-to-route extrapolation:

- **Inhalation Systemic effects - Long-term:** Route to route extrapolation is justified in the absence of test data for repeated dose toxicity via the inhalation route. The dose descriptor has been corrected using the equations on the left-hand side of Example R.8-1 of and methodology described in the ECHA Guidance, Chapter R.8. The standard human bosyweight ised was 60kg to represent the general population. The starting descriptor

Route / Type of effect	DNEL derivation	Assessment factors (AF) for DNEL derivation

was first corrected for differences in molecular weight and stoichiometry between SAlP and phosphoric acid. 1 mole SAlP results in 8 moles H3PO4 thus the dose descriptor is calculated using the following equation: N(L) OAEL(H3PO4) = N(L) OAEL(SAlP) *8*([Mol. Weight(H3PO4)]/[Mol. Weight(SAlP)]). The molecular weight of SAlP in this instance is 1185.57, molecular formula = Na15Al3(PO4)8.

- **Oral Systemic effects - Long-term:** Not applicable. The starting descriptor was first corrected for differences in molecular weight and stoichiometry between SAlP and phosphoric acid. 1 mole SAlP results in 8 moles H3PO4 thus the dose descriptor is calculated using the following equation: N(L) OAEL(H3PO4) = N(L) OAEL(SAlP) *8*([Mol. Weight(H3PO4)]/[Mol. Weight(SAlP)]). The molecular weight of SAlP in this instance is 897.82, molecular formula = Na3H15Al2(PO4)8.

Discussion

In addition when considering the hazard for consumer products of phosphoric acid containing 10 <25% of phosphoric acid; the resultant classification according to the harmonised classification is: Skin irrit. 2 and Eye irrit. 2 (labelled with Hazard Statements H315 and H319) thus resulting assignment as a ‘low hazard’ in accordance with Table E.3-1 and a qualitative assessment that may be less strict than that performed for a moderate hazard.

However, although the likelihood of volatilisation is low as a precautionary measure knowing that volatilisation is possible and inhalation may occur (e. g. if solutions are heated) a classification of respiratory irritation 2 could be applied; thus resulting in the hazard being bumped up to moderate as all three (skin, eye and resp. irrit.) occur simultaneously. As such a worst-case approach based on a moderate hazard will be considered for products containing 10 <25% w/w of phosphoric acid.

Choice of endpoint for DNEL derivation

the following issues were taken into account when deciding on which study to base the DNEL:

1. Nephrocalcinosis (in the form of microconcretions) was observed in the renal tubules of animals investigated in the tests. In general, rats; particularly female rats, are known to be susceptible when administered high doses of dietary phosphate (typically 0.5 -1.0% in the diet). Occupational exposure is not considered to contribute to such exposures and in addition healthy humans are considered to be less sensitive to calcium phosphate precipitation when compared to laboratory rats.

2. Nephrocalcinosis and/or reduced bodyweight gain were the only toxic effects observed in any of the studies.

3. The ratio of sodium, aluminium and phosphate in the test material appears to be less relevant to the toxicity endpoint (NOAEL) than feed consumption, body weight and dose levels. In all rat studies the N(L) OAEL was based on nephrocalcinosis. In two of the studies performed on dogs (standard alternative test species) the N(L) OAEL is the highest dose level tested. In the other two studies minimal nephrocalcinosis and reduced bodyweight was observed at the highest does resulting in the NOAEL being set at the mid dose level.

The LOAEL based on nephrocalcinosis (oral study, 90 days, rat) is lower than any of the reported NOAELs and as such this is used to derive the oral DNEL. As nephrocalcinosis is assumed to be relevant for dietary exposure the endpoints derived on the basis of this effect have no been taken into account for the inhalation route. In the studies where nephrocalcinosis was observed, there were no other forms of toxicity noted and as such it is considered acceptable to base the inhalation DNEL on on the lowest NOAEL. In this instance the NOAEL is taken from 90 day and 6 month studies in the dog and is based on reduced bodyweight gain at the highest dose.

6. HUMAN HEALTH HAZARD ASSESSMENT OF PHYSICOCHEMICAL PROPERTIES

6.1. Explosivity

Data waiving: see CSR section 1.3 Physicochemical properties.

Discussion

The following information is taken into account for any hazard / risk assessment:

No study data available.

Classification according to GHS

Name: orthophosphoric acid

State/form of the substance: solid / aqueous solution

Reason for no classification: conclusive but not sufficient for classification

Classification according to DSD / DPD

Justification for classification or non-classification:

Phosphoric acid does not contain any chemical groups indicating explosive properties and is therefore not considered explosive.

6.2. Flammability

Flammability

Data waiving: see CSR section 1.3 Physicochemical properties.

Discussion

The following information is taken into account for any hazard / risk assessment:

No study data available.

Flash point

Data waiving: see CSR section 1.3 Physicochemical properties.

Classification according to GHS

Name: orthophosphoric acid

State/form of the substance: solid / aqueous solution

Reason for no classification (Flammable gases): conclusive but not sufficient for classification

Reason for no classification (Flammable aerosols): conclusive but not sufficient for classification

Reason for no classification (Flammable liquids): conclusive but not sufficient for classification

Reason for no classification (Flammable solids): conclusive but not sufficient for classification

Justification for classification or non-classification:

Inorganic oxides in which the inorganic element is in its highest possible oxidation state are incapable of further reaction with oxygen and can thus be designated as non-flammable. The oxidation state of phosphorus in phosphoric acid is in its highest possible state (+5).

In the daily use and handling of phosphoric acid during which continuous exposure to air can occur, no

spontaneous ignition is observed. The absence of structural alerts furthermore confirms that it is highly unlikely that phosphoric acid has pyrophoric properties.

Phosphoric acid is mainly used as a dilution in water. Under these use conditions in contact with water no ignition and/or liberation of flammable gases is observed. The absence of structural alerts furthermore confirms that phosphoric acid is not flammable in contact with water.

Based on its chemical nature and the reasoning above, the substance is considered to be non-flammable and testing may be waived as it does not appear scientifically necessary.

6.3. Oxidising potential

Data waiving: see CSR section 1.3 Physicochemical properties.

Classification according to GHS

Name: orthophosphoric acid

State/form of the substance: solid / aqueous solution

Reason for no classification (Oxidising gases): conclusive but not sufficient for classification

Reason for no classification (Oxidising liquids): conclusive but not sufficient for classification

Reason for no classification (Oxidising solids): conclusive but not sufficient for classification

Justification for classification or non-classification:

Phosphoric acid does not contain any chemical groups indicating oxidising properties and is therefore not considered to be an oxidising agent.

7. ENVIRONMENTAL HAZARD ASSESSMENT

7.1. Aquatic compartment (including sediment)

7.1.1. Fish

7.1.1.1. Short-term toxicity to fish

The results are summarised in the following table:

Table 36. Short-term effects on fish

Method	Results	Remarks	Reference
Lepomis macrochirus freshwater pH was remained constant during tests The median lethal pH was determined by exposing 8 bluegill sunfish (L.macrochirus) to decremental pH values every 96 hours until the effect concentration could be derived. The test system (i.e. static, semi-static, flow-through) was not specified, however during the 96-hour intervals at each pH, acid was added as needed to maintain a constant pH. A control aquarium held 8 fish that were maintained at pH 7.5 (the initial pH of the test aquarium).	median lethal pH (96 h): 3 — 3.25 pH (meas. (TWA)) based on: mortality	2 (reliable with restrictions) key study experimental result **Test material (EC name): orthophosphoric acid**	Ellgaard EG and Gilmore JY III (1984)
Aphanius dispar freshwater pH was remained constant during test The median lethal pH was determined by exposing 15 bluegill sunfish (L.macrochirus) to phosphoric acid inducing a certain pH. Several pH values (4.5 - 4.0 - 3.75 - 3.5 - 3.25 - 3.0), were tested. During the 96-hour intervals at each pH, acid was added as needed to maintain a constant pH. A control aquarium held 15 fish that were maintained at pH 7.6.	median lethal pH (96 h): 3.58 pH (meas. (TWA)) based on: mortality	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Alkahem H.F. (1989)
Gambusia affinis freshwater static The study is quite similar to the current OECD guideline 203, however turbid water was used to prepare test solutions.	TLm (median tolerance limit) (96 h): 138 ppm test mat. (nominal) based on: mortality (same effect conc. at 24 and 48h)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Wallen IE, Greer WC and Lasater R (1957)
Gambusia affinis		4 (not assignable)	Von Burg R (1992)

Method	Results	Remarks	Reference
freshwater pH:4.2-7.9		supporting study secondary literature **Test material (EC name): orthophosphoric acid**	
Oncorhynchus kisutch freshwater flow-through Fish were exposed for 24 h to various combinations of dissolved oxygen concentration and pH.		3 (not reliable) supporting study **Test material (EC name): orthophosphoric acid**	Townsend LD and Cheyne H (1944)
Oryzias latipes static OECD Guideline 203 (Fish, Acute Toxicity Test)	LC50 (96 h): 75.1 mg/L test mat. (meas. (geom. mean)) based on: mortality (95% CL: 67.3-82.9 mg/L)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (NIER), Korea (2005b)
Gasterosteus aculeatus Fish were exposed to different solutions of phosphoric acid (different pH values). Survival time was measured.		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Gueylard F and Duval M (1922)

Discussion

A Median lethal pH (96h) of 3-3.25 for Lepomis macrochirus (no guideline followed) has been derived.

All available studies show that mortality is caused by low pH values. When adjusted to environmentally relevant pH values, phosphoric acid does not cause acute adverse effects.

The study from Ellgaard and Gilmore 1982, focuses on the pH effects caused by phosphoric acid. Different pH levels have been tested in bluegill sunfish.

The pH induced by phosphoric acid which caused 50% mortality was between 3.0 and 3.25, while no mortality was observed at pH 3.5 or above after 96h exposure. At neutral pH 7.5 no fish died.

Similar results were obtained in the Alkahem study: a median lethal pH of 3.58 in Aphanius dispar. The Korean study showed a 96h-LC50 of phosphoric acid in Oryzias latipes of 75.1 mg/L, but the pH was not adjusted to relevant environmental values. No mortality was observed at 100 mg/L when the pH was adjusted.

The studies show that a pH caused by adding phosphoric acid roughly between pH 3 (or lower) and 4 is critical for fish. The Gueylard and Duval study showed that survival times increased with increasing pH, and that this increase was more rapid at pH values above 3.5. It can thus be concluded that it is the low pH which is causing the toxic effects. Wallen et al. cited by Von Burg as well described a study in which fish (Gambusia affinis)

were exposed to both phosphoric acid and turbidity (600 ppm of clay particles), and in which phosphoric acid precipitated turbidity to levels below 25 ppm. The median tolerance limit after 24, 48 and 96h exposure was 138 ppm (i. e. about 138 mg/L). Townsend and Cheyne (1944) showed that exposure of Oncorhynchus kisutch fingerlings to 20 ppm of phosphoric acid (i. e. pH 6.75) induced no mortality at relatively normal dissolved oxygen concentrations (4.95 -8.15 ppm). However, when the dissolved oxygen concentration was lowered to 1.50 ppm, phosphoric acid at 12.0 and 20.0 ppm induced 100% mortality, which is obviously caused by the combination of the low dissolved oxygen concentration and the presence of increased hydrogen ion concentrations.

As regulatory ecotoxicity tests need to be conducted at pH 6-9, it can be expected that phosphoric acid will not cause adverse effects to fish when in this pH range.

The following information is taken into account for acute fish toxicity for the derivation of PNEC:

Literature data are available to assess the effects of phosphoric acid on fish. Studies are not performed to an OECD guideline but are considered ot be reliable for assessment (Klimisch 2) as part of a weight of evidence in accordance with Annex XI of Regulation (EC) No. 1907/2006 (REACH). These studies indicate that mortality as a result of phosphoric acid exposure is linked to the pH and not as a result of systemic toxicity.

7.1.1.2. Long-term toxicity to fish

The results are summarised in the following table:

Table 37. Long-term effects on fish

Method	Results	Remarks	Reference
Salvelinus alpinus freshwater life cycle: reproduction, (sub)lethal effects semi-static Three life stages were tested: yearlings, sac fry and eggs. Several pH values, achieved by addition of sulfuric acid, were tested: 3, 3.5, 4, 4.5, 5, 5.5 and 6.	LC50 (192 h): 4.2 pH; yearlings test (meas. (not specified)) based on: mortality (4.0-4.5) LC50 (192 h): 4.3 — 4.5 pH; sac fry test (meas. (not specified)) based on: mortality (4.2-4.6) LC50 (192 h): 4.9 — 5.1 pH; eggs test (meas. (not specified)) based on: mortality (4.5-5.2)	2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sulphuric acid (See endpoint summary for justification of read-across)**	Jagoe CH, Haines TA, Kircheis FW (1984)
Salvelinus fontinalis freshwater life cycle: reproduction, (sub)lethal effects flow-through All developmental stages of the brook trout were continuously exposed to pH levels (4.5-7.1) during up to 5 months. Examinations done were number of viable eggs, embryo hatchability, growth and survival of alevins, adult fish pathology.		2 (reliable with restrictions) supporting study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): sulphuric acid (See endpoint summary for justification of read-across)**	Menendez R (1976)

Data waiving

Information requirement: Long-term toxicity testing on fish

Reason: study scientifically unjustified

Justification: According to Annex IX, section 9.1.6, column 2 of Regulation (EC) No. 1907/2006 (REACH), long-term toxicity testing shall be proposed by the registrant if the chemical safety assessment indicates the need to investigate further the effects on aquatic organisms.

The Guidance on information requirements and chemical safety assessment, Chapter R 7B, Section 7.8.5.4 provides a decision scheme for PNEC derivation. The need to refine the PNECs with additional testing is driven by the need to refine the risk characterisation.

According Annex I of Regulation (EC) No 1907/2006, the exposure assessment and risk characterisation only need to be performed if the substance is PBT, vPvB or is meets the criteria for classification as dangerous according to Directive 67/548/EEC or Directive 1999/45/EEC.

The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore no long-term toxicity testing on fish are proposed.

Discussion

Supporting data:

Jagoe et al. (1984) studied the effects of reduced pH (pH 3-6) induced by sulphuric acid on three life stages (eggs, sac fry and yearlings) of Salvelinus alpinus. Yearlings continuously exposed up to 19 days did not show mortality at pH 4.5 and above. Sac fry continuously exposed for 9 days did not show mortality at pH 5.0 and above. Eggs continuously exposed for 8 days showed significant pH-induced mortality up to pH 5.0. The study showed that yearlings are most resistant to acid stress while eggs are most sensitive.

Menendez (1976) studied the effects of reduced pH (pH 4.5-7.1) induced by sulfuric acid on all developmental stages of Salvelinus fontinalis. Adult fish were exposed for up to 5 months. Embryos from these exposed fish were also exposed and checked for viability and hatchability. Alevins of exposed and non-exposed fish were exposed for 90 days. At pH 4.5 all adult fish died. Total egg production was not affected. At pH 5.0 viability of eggs was significantly decreased compared to controls. Hatchability of embryos was reduced at all pH levels below pH 6.5. The study indicated that continuous exposure to pH levels below 6.5 result in significant reductions in hatchability and growth.

It can be concluded that long-term effects are caused by reduced pH, similar as in the acute ecotoxicity tests. At normal environmental conditions, the pH will be buffered. Moreover, industry is not allowed to release acid wastewater streams to the aquatic environment. Release of phosphoric acid would also negatively influence the conditions in the sewage treatment plant which is not desirable. In the case of phosphoric acid release to the environment, this will be peak exposures due to accidental releases, rather than long-term continuous releases. It is therefore not needed to investigate further the long-term effects of phosphoric acid (or other acids) to fish and other aquatic species. Furthermore, a lot of general studies have been published in the past on long-term and short-term effects to aquatic species induced by pH (hydronium ions) (e. g. the book Acid Toxicity and Aquatic Animals by Morris, Taylor, Brown and Brown, 1989, Cambridge University Press). Many fish species can survive environmental pH values of 4.5 and above, due to calcium reducing the permeability of the gills to other ions (H+ ions). Adaptation may also play a role in surviving low pH levels.

The following information is taken into account for long-term fish toxicity for the derivation of PNEC:

This endpoint is covered by a waiver in accordance with Annex IX, section 9.1.6, column 2 of Regulation (EC) No. 1907/2006 (REACH) and two supporting studies (Jagoe et al., 1984 and Menendez, 1976) on another acid, namely sulfuric acid. These supporting studies provide information regarding the effects of pH on the early life stages of fish.

7.1.2. Aquatic invertebrates

7.1.2.1. Short-term toxicity to aquatic invertebrates

The results are summarised in the following table:

Table 38. Short-term effects on aquatic invertebrates

Method	Results	Remarks	Reference
Daphnia magna	EC50 (48 h): > 100 mg/L	1 (reliable without	S L Priestly D M

Method	Results	Remarks	Reference
freshwater static OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test) EU Method C.2 (Acute Toxicity for Daphnia)	test mat. (nominal) based on: immobilisation (95% CL not stated)	restriction) key study experimental result **Test material (EC name): orthophosphoric acid** Form: viscous	Mullee (2010)
Daphnia magna, Daphnia pulex, Gammarus pulex and Gammarus fossarum freshwater static Four freshwater invertebrates were exposed for 12 or 24 hours to solutions of phosphoric acid with different pH.	median lethal pH (12 h): 4.1 pH (meas. (TWA)) based on: mortality (Daphnia pulex) median lethal pH (12 h): 4.6 pH (meas. (TWA)) based on: mortality (Daphnia magna)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Von Brehm J. and Meijering M.P.D. (1982)
Daphnia magna static OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)	EC50 (24 h): > 376 mg/L test mat. (meas. (geom. mean)) based on: mobility EC50 (48 h): > 376 mg/L test mat. (meas. (geom. mean)) based on: mobility	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (NIER) (2005)

Discussion

One reliable study (Priestly, 2010 from Harlan Laboratories) was available which was given a Klimisch 1 score. The study was performed according to OECD TG 202 and EC Method C.2, and according to GLP principles. In the study, Daphnia magna were exposed to aqueous solutions of phosphoric acid under static test conditions. The pH was adjusted to 7 (pH from 7 to 7.8).

The concentrations that were tested were 10, 18, 32, 56 and 100 mg/L. The 48h-EC50 was >100 mg/L and the NOEC = 56 mg/L, based on nominal concentrations. Measured test concentrations ranged from 82% to 94% of nominal at the start of the test, and from 80 % to 92% after 48h.

The following information is taken into account for short-term toxicity to aquatic invertebrates for the derivation of PNEC:

Short-term toxicity to aquatic invertebrates: EC50 (48h) >100 mg/L for Daphnia magna (OECD TG 202, static, Klimisch reliability 1)

Value used for CSA:

EC50/LC50 for freshwater invertebrates: 100 mg/L

7.1.2.2. Long-term toxicity to aquatic invertebrates

Data waiving

Information requirement: Long-term toxicity testing on aquatic invertebrates

Reason: study scientifically unjustified

Justification: According to Annex IX, section 9.1.5, column 2 of Regulation (EC) No. 1907/2006 (REACH), long-term toxicity testing shall be proposed by the registrant if the chemical safety assessment indicates the need to investigate further the effects on aquatic organisms.

The Guidance on information requirements and chemical safety assessment, Chapter R 7B, Section 7.8.5.4 provides a decision scheme for PNEC derivation. The need to refine the PNECs with additional testing is driven by the need to refine the risk characterisation.

According Annex I of Regulation (EC) No 1907/2006, the exposure assessment and risk characterisation only need to be performed if the substance is PBT, vPvB or is meets the criteria for classification as dangerous according to Directive 67/548/EEC or Directive 1999/45/EEC.

The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore no long-term toxicity testing on daphnia are proposed.

7.1.3. Algae and aquatic plants

The results are summarised in the following table:

Table 39. Effects on algae and aquatic plants

Method	Results	Remarks	Reference
Desmodesmus subspicatus (algae) freshwater static EU Method C.3 (Algal Inhibition test) OECD Guideline 201 (Alga, Growth Inhibition Test)	EC50 (72 h): > 100 mg/L test mat. (nominal) based on: growth rate (95% CL not stated) NOEC (72 h): 100 mg/L test mat. (nominal) based on: growth rate (95% CL not stated)	1 (reliable without restriction) key study experimental result **Test material (EC name): orthophosphoric acid** Form: viscous	H Vryenhoef D M Mullee (2010)
Pseudokirchnerella subcapitata (algae) static OECD Guideline 201 (Alga, Growth Inhibition Test)	EC50 (72 h): 77.9 mg/L test mat. (meas. (geom. mean)) based on: growth rate (95% CL: 66.2-92.8 mg/L) NOEC (72 h): < 7.5 mg/L test mat. (meas. (geom. mean)) based on: growth rate LOEC (72 h): 7.5 mg/L test mat. (meas. (geom. mean)) based on: growth rate EC10 (72 h): 37.7 mg/L test mat. (meas. (geom. mean)) based on: growth rate (95% CL: 21.9-48.1 mg/L) EC20 (72 h): 49.2 mg/L test mat. (meas. (geom. mean)) based on: growth rate (95% CL: 34.1-59.2 mg/L)	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	National Institute of Environmental Research (NIER) (2007)

Discussion

Effects on algae / cyanobacteria

One reliable study (Harlan Laboratories Ltd - Vryenhoef, H & Mullee DM, 2010) was available which was given a Klimisch 1 score. The study was performed according to OECD TG 201 and EC Method C.3, and according to GLP principles. In this limit study, green alga Desmodesmus Subspicatus were exposed to an aqueous solution of phosphoric acid at 100 mg/L under static test conditions for 72h. The pH was adjusted to neutral (pH 7.5).

The choice for doing a limit test was based on a preliminary test in which the algae were exposed to concentrations of 0.1, 1, 10 and 100 mg/L with and without pH adjustment. When the pH was not adjusted, the ErC50 was 75 mg/L and the NOEC=10 mg/L. The pH of the 100 mg/L test solution was 3.0 while the pH of the 10 mg/L test solution was 6.3 -6.4.

When the pH was adjusted, the result obtained in the final limit test are: ErC50>100 mg/L and NOEC=100 mg/L, based on nominal concentrations. Measured test concentrations ranged from 103% to 106% of nominal at the start of the test, and from 97% to 99% after 72h.

The following information is taken into account for effects on algae / cyanobacteria for the derivation of PNEC:

Freshwater alga and cyanobacteria, growth inhibition test: ErC50 (72h) >100 mg/L for green alga Desmodesmus subspicatus (OECD TG 201, static, Klimisch reliabilty 1)

Value used for CSA:

EC50/LC50 for freshwater algae: 100 mg/L

EC10/LC10 or NOEC for freshwater algae: 100 mg/L

7.1.4. Sediment organisms

Data waiving

Information requirement: Effects on sediment organisms

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.5.1, column 2 of Regulation (EC) No. 1907/2006 (REACH), long term toxicity testing to sediment organisms shall be proposed by the registrant if the results of the chemical safety assessment indicate a need to investigate further the effects of the substance.

The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Furthermore, due to its high water solubility, the substance will be present in the water phase rather than in the sediment and as such the chemical safety assessment does not indicate a cause for concern for toxicity to sediment organisms. Further testing is not required.

7.1.5. Other aquatic organisms

No relevant information available

7.2. Terrestrial compartment

All endpoints that are relevant for terrestrial toxicity under REACH are mainly covered by waivers.

Phosphoric acid does not have a high potential for adsorption to soil. It is highly water soluble and will dissociate into hydronium cations and its conjugated base anions. Therefore direct and indirect exposure of the soil compartment is deemed irrelevant. Phosphoric acid will infiltrate and migrate downward due to its high water solubility. In the process it can dissolve some soil materials and be partially neutralized in the process. On reaching the ground table phosphoric acid will be dispersed and diluted. The toxicity studies on soil macroorganisms, terrestrial arthropods, terrestrial plants and soil microorganisms are therefore waived. In addition, the CSR did not show any concern for the soil compartment.

A germination study with lettuce is available (Reynolds, 1975). The phosphoric acid concentration at which germination of lettuce is inhibited by 50% after 72h of exposure at 29°C is high, namely 16.4±2.45 g/L,

inducing a pH as low as 1.3. This gives an indication that terrestrial plants may be able to manage pH values that are lower than normal environmental pH values.

Long-term toxicity to birds is not relevant either and therefore waived, as phosphoric acid has a low potential for bioaccumulation and biomagnification, due to its high water solubility. A short-term study with rock doves (Sterner, 1993) showed only effects on food and water consumption (and consequently on body weight) probably induced by local irritating effects (not confirmed) or by stress due to handling.

7.2.1. Toxicity to soil macro-organisms

Data waiving

Information requirement: Toxicity to soil macro-organisms except arthropods

Reason: study scientifically unjustified

Justification: According to Annex IX, Section 9.4.1, Column 2 of Regulation (EC) No. 1907/2006 (REACH), a study to assess the short-term toxicity to soil organisms does not need to be conducted if direct and indirect exposure of the soil compartment is unlikely. Direct exposure to soil is likely for phosphoric acid, however, due to high water solubility phosphoric acid will infiltrate and migrate downwards. During this process soil materials will be dissolved and will result in the partial neutralisation of phosphoric acid to inorganic phosphate salts such as sodium and potassium orthophosphates. Phosphate is ubiquitous in the environment and is found naturally in soil, water and sediment. Phosphate will be assimilated by species residing in the natural environment and are necessary micronutrients that are required to maintain a good chemical balance in soils, water and sediment. Phosphate is not considered to be toxic to soil organisms.

In addition, column 2 also states that a study does not need to be performed in the absence of toxicity data for soil organisms, where the equilibrium partitioning method may be applied to assess the hazard to soil organisms. The equilibrium partitioning method is not suitable for inorganic materials however a qualitative assessment can be made for phosphoric acid on the following basis: The risk to soil organisms from phosphoric acid would be due to the acidic nature of the material acidifying the soil microenvironment and inhibiting the organisms present. Phosphoric acid has not been shown to be systemically toxic to aquatic organisms under normal test conditions and at a neutral pH, as recommended by the relevant test methods. Similar conditions would be expected under normal environmental conditions due to the natural presence of various ionic components of soils that would neutralise the phosphoric acid.

It is therefore expected that studies to determine the toxicity of phosphoric acid to soil organisms would not result in toxicity and would not yield any useful information for risk assessment and as such a study is not considered to be scientifically justified and has not been performed.

Information requirement: Toxicity to soil macro-organisms except arthropods

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.4.4, column 2 of Regulation (EC) No. 1907/2006 (REACH), Long term toxicity testing shall be proposed by the registrant if the results of the chemical safety assessment indicates the need to investigate further the effects of the substance on terrestrial organisms

The chemical safety assessment concludes that the substance is not classified and is of no immediate concern to the environment. The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore further testing is deemed to be scientifically unjustified.

Information requirement: Toxicity to soil arthropods

Reason: study scientifically unjustified

Justification: According to Annex IX, Section 9.4.1, Column 2 of Regulation (EC) No. 1907/2006 (REACH), a study to assess the short-term toxicity to soil organisms does not need to be conducted if direct and indirect exposure of the soil compartment is unlikely. Direct exposure to soil is likely for phosphoric acid, however, due to high water solubility phosphoric acid will infiltrate and migrate downwards. During this process soil materials will be dissolved and will result in the partial neutralisation of phosphoric acid to inorganic phosphate salts such as sodium and potassium orthophosphates. Phosphate is ubiquitous in the environment and is found naturally in soil, water and sediment. Phosphate will be assimilated by species residing in the natural environment and are necessary micronutrients that are required to maintain a good chemical balance in soils, water and sediment. Phosphate is not considered to be toxic to soil organisms.

In addition, column 2 also states that a study does not need to be performed in the absence of toxicity data for soil organisms, where the equilibrium partitioning method may be applied to assess the hazard to soil organisms. The equilibrium partitioning method is not suitable for inorganic materials however a qualitative assessment can be made for phosphoric acid on the following basis: The risk to soil organisms from phosphoric acid would be due to the acidic nature of the material acidifying the soil microenvironment and inhibiting the organisms present. Phosphoric acid has not been shown to be systemically toxic to aquatic organisms under normal test conditions and at a neutral pH, as recommended by the relevant test methods. Similar conditions would be expected under normal environmental conditions due to the natural presence of various ionic components of soils that would neutralise the phosphoric acid.

It is therefore expected that studies to determine the toxicity of phosphoric acid to soil organisms would not result in toxicity and would not yield any useful information for risk assessment and as such a study is not considered to be scientifically justified and has not been performed.

Information requirement: Toxicity to soil arthropods

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.4.4, column 2 of Regulation (EC) No. 1907/2006 (REACH), Long term toxicity testing shall be proposed by the registrant if the results of the chemical safety assessment indicates the need to investigate further the effects of the substance on terrestrial organisms

The chemical safety assessment concludes that the substance is not classified and is of no immediate concern to the environment. The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore further testing is deemed to be scientifically unjustified.

7.2.2. Toxicity to terrestrial plants

The results are summarised in the following table:

Table 40. Effects on terrestrial plants

Method	Results	Remarks	Reference
Lactuca sativa (Dicotyledonae (dicots)) short-term toxicity (laboratory study) seed germination/root elongation toxicity test Substrate: 0.5% agar medium Germination of lettuce fruits was examined by using dilute medium (to eliminate osmotic effects) and exposure to acids.	*Lactuca sativa*: EC50 (72 h): 16.4 g/L test mat. (nominal) based on: germination (pH 1.3 and 95% CI 13.9-18.8 g/L)	3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Reynolds T (1975)

Data waiving

Reason: study scientifically unjustified

Justification: According to Annex IX, Section 9.4.3, Column 2 of Regulation (EC) No. 1907/2006 (REACH), a study to assess the short-term toxicity to terrestrial plants does not need to be conducted if direct and indirect exposure of the soil compartment is unlikely. Direct exposure to soil is likely for phosphoric acid, however, due to high water solubility phosphoric acid will infiltrate and migrate downwards. During this process soil materials will be dissolved and will result in the partial neutralisation of phosphoric acid to inorganic phosphate salts such as sodium and potassium orthophosphates. Phosphate is ubiquitous in the environment and is found naturally in soil, water and sediment. Phosphate will be assimilated by species residing in the natural environment and are necessary micronutrients that are required to maintain a good chemical balance in soils, water and sediment. Phosphate is not considered to be toxic to plants as it is an essential nutrient for growth.

In addition, column 2 also states that a study does not need to be performed in the absence of toxicity data for soil organisms, where the equilibrium partitioning method may be applied to assess the hazard to soil organisms. The equilibrium partitioning method is not suitable for inorganic materials however a qualitative assessment can be made for phosphoric acid on the following basis: The risk to terrestrial plants from phosphoric acid would be due to the acidic nature of the material acidifying the soil microenvironment and inhibiting the organisms present. Phosphoric acid has not been shown to be systemically toxic to aquatic algae under normal test conditions and at a neutral pH, as recommended by the relevant test methods (Freshwater alga and cyanobacteria, growth inhibition test: ErC50 (72h) >100 mg/L for green alga Desmodesmus subspicatus according to OECD TG 201, static, Klimisch reliability 1). Similar conditions would be expected under normal environmental conditions due to the natural presence of various ionic components of soils that would neutralise the phosphoric acid.

It is therefore expected that studies to determine the toxicity of phosphoric acid to terrestrial plants would not result in toxicity and would not yield any useful information for risk assessment and as such a study is not considered to be scientifically justified and has not been performed.

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.4.6, column 2 of Regulation (EC) No. 1907/2006 (REACH), Long term toxicity testing shall be proposed by the registrant if the results of the chemical safety assessment indicates the need to investigate further the effects of the substance on terrestrial organisms

The chemical safety assessment concludes that the substance is not classified and is of no immediate concern to the environment. The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore further testing is deemed to be scientifically unjustified.

7.2.3. Toxicity to soil micro-organisms

Data waiving

Information requirement: Effects on soil micro-organisms

Reason: study scientifically unjustified

Justification: According to Annex IX, Section 9.4.1, Column 2 of Regulation (EC) No. 1907/2006 (REACH), a study to assess the short-term toxicity to soil organisms does not need to be conducted if direct and indirect exposure of the soil compartment is unlikely. Direct exposure to soil is likely for phosphoric acid, however, due to high water solubility phosphoric acid will infiltrate and migrate downwards. During this process soil materials will be dissolved and will result in the partial neutralisation of phosphoric acid to inorganic phosphate salts such as sodium and potassium orthophosphates. Phosphate is ubiquitous in the environment and is found naturally in soil, water and sediment. Phosphate will be assimilated by species residing in the natural environment and are necessary micronutrients that are required to maintain a good chemical balance in soils, water and sediment.

In addition, column 2 also states that a study does not need to be performed in the absence of toxicity data for soil organisms, where the equilibrium partitioning method may be applied to assess the hazard to soil organisms. The equilibrium partitioning method is not suitable for inorganic materials however a qualitative assessment can be made for phosphoric acid on the following basis: The risk to soil organisms from phosphoric acid would be due to the acidic nature of the material acidifying the soil microenvironment and inhibiting the organisms present. Phosphoric acid has not been shown to be systemically toxic to aquatic organisms under normal test conditions and at a neutral pH, as recommended by the relevant test methods. Similar conditions would be expected under normal environmental conditions due to the natural presence of various ionic components of soils that would neutralise the phosphoric acid.

It is therefore expected that studies to determine the toxicity of phosphoric acid to soil organisms would not result in toxicity and would not yield any useful information for risk assessment and as such a study is not considered to be scientifically justified and has not been performed.

Information requirement: Effects on soil micro-organisms

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.4.4, column 2 of Regulation (EC) No. 1907/2006 (REACH), Long term toxicity testing shall be proposed by the registrant if the results of the chemical safety

assessment indicates the need to investigate further the effects of the substance on terrestrial organisms.

The chemical safety assessment concludes that the substance is not classified and is of no immediate concern to the environment. The available data is adequate for classification and labelling purposes and PBT assessment is not required for inorganic substances. Therefore further testing is deemed to be scientifically unjustified.

7.2.4. Toxicity to other terrestrial organisms

No relevant information available

7.3. Atmospheric compartment

7.4. Microbiological activity in sewage treatment systems

The results are summarised in the following table:

Table 41. Effects on micro-organisms

Method	Results	Remarks	Reference
activated sludge of a predominantly domestic sewage freshwater static OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test) EU Method C.11 (Biodegradation: Activated Sludge Respiration Inhibition Test) EPA OPPTS 850.6800 (Modified Activated Sludge, Respiration Inhibition Test for Sapringly Soluble Chemicals)	NOEC (3 h): 1000 mg/L test mat. (nominal) based on: respiration rate (not specified) EC50 (3 h): > 1000 mg/L test mat. (nominal) based on: respiration rate (not specified)	2 (reliable with restrictions) key study read-across from supporting substance (structural analogue or surrogate) **Test material (EC name): Dipotassium hydrogenorthophosphate (See endpoint summary for justification of read-across)** Form: powder	N Clarke (2010)
activated sludge and protozoa	IC50 : 270 mg/L test mat. based on: oxygen consumption IC50 : 240 mg/L test mat. based on: mortality of protozoa	4 (not assignable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Ishii H, Kaji T and Noguchi J (1981)

Discussion

According to Annex VIII, section 9.1.4, column 2 of Regulation (EC) No. 1907/2006 (REACH) a study for activated sludge respiration inhibition testing does not need to be performed if there are mitigating factors indicating that microbial toxicity is unlikely to occur. Phosphoric acid will dissociate in water to phosphate anions and H+ ions, the latter causing a decrease of pH. However, pH levels in wastewater are typically adjusted in the wastewater treatment plant to ensure a neutral discharge to the receiving water (e. g., pH between 6-9) and in order to prevent inhibitory effects on the growth of microorganisms. Therefore, the microorganisms are essentially not exposed to phosphoric acid, but to phosphate instead.

Furthermore, phosphate is an essential nutrient for activated sludge systems, as it comprises part of the biomass in the activated sludge. Typical influent values in domestic sewage are as follows: Total phosphate as P: 4 – 15 mg/L; Inorganic phosphate as P: 3-10 mg/L.

When influent phosphate levels are at such levels that phosphate could pass through a treatment plant and result in excessive levels in a receiving water, additional unit operations are added to a treatment plant (e. g., precipitation) to remove excess phosphate.

A study on dipotassium orthophosphate was available and as such in accordance with Annex XI, Section 1.5 of REACH which states that read-across may be used in the case of substances whose physicochemical, toxicological and ecotoxicological properties are likely to be similar. Similarities may be based on:

1) A common functional group

2) The common precursors and/or the likelihood of common breakdown products via physiological and biological processes, which result in structurally similar chemicals; or

3) A constant pattern in the changing of the potency of the properties across the category

Orthophosphoric acid and dipotassium orthophosphate have the following similarities:

1). Both substances share the PO_4^{3-}anion as common functional groups.

2) Both substances will ultimately dissociate into the common breakdown products of the PO_4^{3-}anion.

The supporting study (Ishii et al) assessed the toxicity of phosphoric acid itself to microorganisms by using the oxygen absorption rate of activated sludge. The toxicity of phosphoric acid to protozoa was measured by looking at mortality. The IC50 values were 270 and 240 mg/L, respectively. It can be concluded that phosphoric acid is of low toxicity to microorganisms.

The following information is taken into account for effects on aquatic micro-organisms for the derivation of PNEC:

Activated sludge respiration inhibition test: EC50 (3h) >1000 mg/L for activated sludge of a predominantly domestic sewage (OECD TG 209, static, Klimisch reliability 1)

Value used for CSA:

EC50/LC50 for aquatic micro-organisms: 1000 mg/L

EC10/LC10 or NOEC for aquatic micro-organisms: 1000 mg/L

7.5. Non compartment specific effects relevant for the food chain (secondary poisoning)

7.5.1. Toxicity to birds

The results are summarised in the following table:

Table 42. Effects on birds

Method	Results	Remarks	Reference
Colomba livia acute oral toxicity (full-body inhalation) Rock doves were exposed to aerosols of 95% red phosphorus/5% butyl rubber in inhalation chambers. The procedure consisted of a 2-day pre-exposure phase, a 2-day exposure		3 (not reliable) supporting study experimental result **Test material (EC name): orthophosphoric acid**	Sterner RT (1993)

Method	Results	Remarks	Reference
phase and a 6-day post-exposure phase.			

Data waiving

Information requirement: Toxicity to birds

Reason: study scientifically unjustified

Justification: According to Annex X, Section 9.6.1, column 2 of Regulation (EC) No. 1907/2006 (REACH), any need for testing should be carefully considered taking into account the large mammalian dataset that is usually available at this tonnage level. In addition, bioconcentration, bioaccumulation and biomagnification are anot considered to be relevant for phosphoric acid.

There is an adequate data set for mammalian toxicity and no indication from the chemical safety report to suggest that testing would be required and therefore further testing is scientifically unjustified.

Discussion

There is an adequate data set for mammalian toxicity and no indication from the chemical safety report to suggest that testing would be required. No study is proposed for phosphoric acid.

In the supporting study (Sterner, 1993) in which rock doves are exposed for 2 days via inhalation to phosphoric acid aerosols, no evidence of systemic effects were provided. The available data implies that the observed nutrient depletion/fluid loss are due to acid aerosol-induced ulcerations of soft tissue, although the presence of ulcers/edema is unconfirmed. Another explanation for the consumatory behaviour is the stress caused by handling and chamber confinement of the doves.

The following information is taken into account for effects on birds for the derivation of PNEC:

For this endpoint a waiver is proposed, and a supporting study (Sterner, 1993) although Klimisch 3 scored, is presented.

7.5.2. Toxicity to mammals

No relevant information available

7.6. PNEC derivation and other hazard conclusions

Table 43. Hazard assessment conclusion for the environment

Compartment	Hazard conclusion	Remarks/Justification
Freshwater	No data: aquatic toxicity unlikely	The predominant adverse effects of phosphoric acid in aquatic systems are pH-related effects, as a result of the acidic nature of phosphoric acid. As phosphoric acid is a triprotic acid it will dissociate up to 3 times; releasing a phosphate anion (H2PO4-, HPO42- or PO43-) and a H+ ion at each dissociation. The fate of the H+ ions (and subsequently the resultant pH) will depend on the chemical composition of the receiving water body. The pH of the receiving body can vary significantly between different ecosystems and geographical locations and also the pH change as a consequence of anthropogenic phosphoric acid is influenced by the buffering capacity of the receiving water. Changes in the pH of a water body can have potentially toxic effects on the endogenous aquatic organisms present. However, the sensitivity of the organisms to pH changes vary significantly according to location or species (pH ranges of tolerance for the major taxonomic groups, fish, crustaceans and algae, are commonly report to vary between pH 6.0 and pH 9.0). The phosphate anions are not considered to be toxic to the aquatic environment as phosphate anions are naturally widespread both in the environment and within organisms and cells, and they are readily assimilated as an essential nutrient by the aquatic organisms. It is therefore not considered

Compartment	Hazard conclusion	Remarks/Justification
		appropriate to derive a PNECaqua on the basis of single-species ecotoxicology data as the main risk factor has been determined to be a phosphoric acid related change in the pH of the receiving water body rather than direct toxicity of phosphoric acid to the target organisms (in a laboratory study the test media would be buffered to pH-neutral thus sequestering the H+ ions and as such no adverse effects would be expected).
Marine water	No data: aquatic toxicity unlikely	The predominant adverse effects of phosphoric acid in aquatic systems are pH-related effects, as a result of the acidic nature of phosphoric acid. As phosphoric acid is a triprotic acid it will dissociate up to 3 times; releasing a phosphate anion (H2PO4-, HPO42- or PO43-) and a H+ ion at each dissociation. The fate of the H+ ions (and subsequently the resultant pH) will depend on the chemical composition of the receiving water body. The pH of the receiving body can vary significantly between different ecosystems and geographical locations and also the pH change as a consequence of anthropogenic phosphoric acid is influenced by the buffering capacity of the receiving water. Changes in the pH of a water body can have potentially toxic effects on the endogenous aquatic organisms present. However, the sensitivity of the organisms to pH changes vary significantly according to location or species (pH ranges of tolerance for the major taxonomic groups, fish, crustaceans and algae, are commonly report to vary between pH 6.0 and pH 9.0). The phosphate anions are not considered to be toxic to the aquatic environment as phosphate anions are naturally widespread both in the environment and within organisms and cells, and they are readily assimilated as an essential nutrient by the aquatic organisms. It is therefore not considered appropriate to derive a PNECaqua on the basis of single-species ecotoxicology data as the main risk factor has been determined to be a phosphoric acid related change in the pH of the receiving water body rather than direct toxicity of phosphoric acid to the target organisms (in a laboratory study the test media would be buffered to pH-neutral thus sequestering the H+ ions and as such no adverse effects would be expected). In addition, pH-related effects are considered to be of lower risk in marine water due to its buffering capacity being greater than that of freshwater.
Intermittent releases to water	No data: aquatic toxicity unlikely	The predominant adverse effects of phosphoric acid in aquatic systems are pH-related effects, as a result of the acidic nature of phosphoric acid. As phosphoric acid is a triprotic acid it will dissociate up to 3 times; releasing a phosphate anion (H2PO4-, HPO42- or PO43-) and a H+ ion at each dissociation. The fate of the H+ ions (and subsequently the resultant pH) will depend on the chemical composition of the receiving water body. The pH of the receiving body can vary significantly between different ecosystems and geographical locations and also the pH change as a consequence of anthropogenic phosphoric acid is influenced by the buffering capacity of the receiving water. Changes in the pH of a water body can have potentially toxic effects on the endogenous aquatic organisms present. However, the sensitivity of the organisms to pH changes vary significantly according to location or species (pH ranges of tolerance for the major taxonomic groups, fish, crustaceans and algae, are commonly report to vary between pH 6.0 and pH 9.0). The phosphate anions are not considered to be toxic to the aquatic environment as phosphate anions are naturally widespread both in the environment and within organisms and cells, and they are readily assimilated as an essential nutrient by the aquatic organisms. It is therefore not considered appropriate to derive a PNECaqua on the basis of single-species ecotoxicology data as the main risk factor has been determined to be a phosphoric acid related change in the pH of the receiving water body

Compartment	Hazard conclusion	Remarks/Justification
		rather than direct toxicity of phosphoric acid to the target organisms (in a laboratory study the test media would be buffered to pH-neutral thus sequestering the H+ ions and as such no adverse effects would be expected).
Sediments (freshwater)	No hazard identified	No data are available for sediments. Phosphoric acid will progressively dissociate in water to give H+ and PO43- ions. Due to its high water solubility and low vapour pressure it is predicted that any un-dissociated phosphoric acid will remain in the water phase and will not absorb onto particulate. The PO43- ion is likely to absorb onto sediment, however, PO43- ions are ubiquitous in the environment and are found naturally in soil, water and sediment. They are assimilated by species residing in the sediment, water or soil and are essential for maintaining a good chemical balance. Toxicity to sediment organisms via this route is not predicted and as such further toxicity studies to determine a PNECsediment are not considered to be scientifically justified.
Sediments (marine water)	No hazard identified	No data are available for marine sediments. Phosphoric acid will progressively dissociate in water to give H+ and PO43- ions. Due to its high water solubility and low vapour pressure it is predicted that any un-dissociated phosphoric acid will remain in the water phase and will not absorb onto particulate. The PO43- ion is likely to absorb onto sediment, however, PO43- ions are ubiquitous in the environment and are found naturally in soil, water and sediment. They are assimilated by species residing in the sediment, water or soil and are essential for maintaining a good chemical balance. Toxicity to sediment organisms via this route is not predicted and as such further toxicity studies to determine a PNECsediment are not considered to be scientifically justified.
Sewage treatment plant	No data: aquatic toxicity unlikely	No data are available for STP microorganisms. In water phosphoric acid will progressively dissociate to phosphate anions (PO43-) and hydrogen cations (H+). The release of H+ ions will lead to a net decrease in the pH of the receiving water body. However, in the case of waste water treatment plants, the pH levels are typically adjusted to ensure a neutral discharge to the receiving water and in order to prevent pH-related inhibitory effects on the growth of STP microorganisms. The neutralisation of phosphoric acid would result in the STP microoganisms being exposed to phosphate. Phosphate is an essential nutrient for activated sludge systems and does not result in adverse effects. It is therefore not considered appropriate or meaningful to derive a PNEC STP for phosphoric acid.
Soil	No hazard identified	No data are available for soil organisms. Phosphoric acid occurs naturally and widely in low concentrations in soils, In addition, phosphoric acid is widely used as a plant fertiliser, either as such or as a processing residue in superphosphates, and as a soil stabiliser (through reactions with aluminium molecules in clays). When spilled on to soil phosphoric acid will initially infiltrate downwards, but in most cases it will dissociate to PO43- and H+ ions in the soil pore water, and/or react with minerals present in the soil, in particular calcium, iron and aluminium . Except in very specific circumstances (acidic soils, certain mineral soil types, very high dosage of phosphoric acid) phosphoric acid will not therefore penetrate beyond the surface layer of soil and will not reach the groundwater table. Phosphate loss to surface water is usually related to run-off or erosion of soil particles, which carry the attached phosphates. Accidental release of significant quantities of concentrated phosphoric acid into soil may cause soil to expand as the phosphoric acid is neutralised by the lime already present in the soils resulting in calcium phosphate minerals replacing calcium carbonate. Phosphate ions released into soil are not anticipated to result in toxicity to soil-dwelling

Compartment	Hazard conclusion	Remarks/Justification
		organisms as phosphate is an essential nutrient. Toxicity to terrestrial organisms via this route is only considered to be as a result of localised pH changes; as such it is not justified to further investigate the effects of phosphoric acid on terrestrial organisms as the potential effects are highly variable according to location and soil composition and a reliable PNEC soil cannot be calculated. If phosphoric acid does reach the groundwater table any remaining phosphoric acid will dissociate to PO43- and H+ ions; the resultant ions may be dispersed and diluted in the ground water.
Air	No hazard identified	
Secondary poisoning	No potential for bioaccumulation	Phosphoric acid is not considered to pose a risk of secondary poisoning as it is not anticipated to bioaccumulate. Phosphoric acid will progressively dissociate into PO43- and H+ ions in aqueous environments; these ions are not lipophillic and will therefore not accumulate in fatty tissues. It not considered necessary to derive a PNEC to take into account the risk of secondary poisoning and no further testing is considered necessary.

Environmental classification justification

Phosphoric acid is not considered to be classified as toxic to the aquatic environment.

General discussion

Phosphorus is an essential nutrient of microorganisms, plants and animals. is usually the limiting nutrient in ecosystems: it Phosphoric acid can be readily utilisable by aquatic/terrestrial plants and microorganisms. Phosphorus compounds are an important component of living matter and all organisms contain a certain quantity; however, excessive bioaccumulation is unlikely due to natural metabolic processes for essential nutrients (Frausto da Silva & Williams, 1991). Thanks to its high water solubility and low vapour pressure, phosphoric acid is mainly found in soil (migrating towards the groundwater table) and water compartments: there, phosphoric acid progressively dissociates affecting the pH of the receiving compartment.

Phosphoric acid progressively dissociates as pH is raised from about 3.0 to above 7.0.

H_3PO_4 <=> H^+ + $H_2PO_4^-$ <=> $2H^+$ + HPO_4^{2-} <=> $3H^+$ + PO_4^{3-}; respectively pKa 2.2; pKa 7.2; pKa 12.3.

The third H+ is generally only lost in alkaline conditions. Under relevant environmental pH range (pH5 to pH8), the monovalent and divalent phosphates are dominant ($H_2PO_4^-$ and HPO_4^{2-}). As reported in "Acid soils of the tropics" (Harder RD) because of this dissolution, when phosphorus fertilizer is placed in a band, very low pH values can be attained. The acidity will then gradually diffuse into the soil surrounding the band. According to Lindsay and Stephenson (1959), pH values as low as 1.5 can be found in a zone immediately around a fertilizer band. Natural pH can vary significantly as well as organisms sensitivity in adapting to such change. A pH range of 6 -9 is generally considered safe for aquatic organisms. Moreover, pH change due to anthropogenic release of phosphoric acid is influenced by the buffer capacity of the receiving water.

References:

Frausto da Silva JJR and Williams RJP, The Biological Chemistry of the Elements: The Inorganic Chemistry of Life; Oxford University Press: Oxford, 1991.

Harder RD (2002) Acid soils of the tropics, An Echo Technical Note

Lindsay WL and Stephenson HF (1959) Nature of the reactions of monocalcium phosphate monohydrate in soils, Soil Sci. Soc. Am. J. 23(1): 12-

8. PBT AND vPvB ASSESSMENT

8.1. Assessment of PBT/vPvB Properties

8.1.1. PBT/vPvB criteria and justification

8.1.2. Summary and overall conclusions on PBT or vPvB properties

Overall conclusion:

PBT assessment does not apply.

Justification:

In accordance with Annex XIII of Regulation (EC) No. 1907/2006 (REACH) and the Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.11: PBT Assessment; the criteria for the identification of PBT and vPvB substances do not apply to inorganic substances. Phosphoric acid is not considered to require any further assessment of PBT properties.

9. EXPOSURE ASSESSMENT (and related risk characterisation)

9.0. Introduction

9.0.1. Overview of uses and Exposure Scenarios

Tonnage information:

Assessed tonnage: 10000000.0 tonnes/year based on:

- 9500000.0 tonnes/year manufactured
- 500000.0 tonnes/year imported

Tonnage supplied per market sector:

Chemical synthesis (PC 19: Intermediate): 1000000.0 tonnes/year

Surface treatment applications (PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)): 500000.0 tonnes/year

Cleaning agents (PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other): 1000000.0 tonnes/year

Chemical industry (PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products): 200000.0 tonnes/year

Phosphate Source (PC 0: Other): 200000.0 tonnes/year

Building and Construction (PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other): 200000.0 tonnes/year

Plastics, resins and paints (PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other): 200000.0 tonnes/year

Waste-water treatment (PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals): 200000.0 tonnes/year

Lubricants and lubricant additives (PC 24: Lubricants, Greases, Release Products): 200000.0 tonnes/year

Fertilisers (PC 12: Fertilizers): 6000000.0 tonnes/year

Soldering aids (PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products): 100000.0 tonnes/year

PPE Cartridges (PC 2: Adsorbents): 100000.0 tonnes/year

Orthodontics, medical devices (PC 0: Other): 100000.0 tonnes/year

Use in plant protection products (under Regulation 1107/2009) (PC 27: Plant Protection Products): 200.0 tonnes/year

The following table list all the exposure scenarios (ES) assessed in this CSR.

Table 44. Overview of exposure scenarios and contributing scenarios

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
ES1 - M1		Manufacture - Manufacture of substance - Manufacture of substance (ERC 1) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Use as laboratory reagent (PROC 15)	9500000.0
ES2 - F1		Formulation - Formulation of preparations - Formulation of preparations (ERC 2) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Use as laboratory reagent (PROC 15) - Hand-mixing with intimate contact and only PPE available (PROC 19)	5000000.0
ES3 - PW1		Use by professional worker - Formulation & (re)packing of substances and mixtures - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Use as laboratory reagent (PROC 15) - Hand-mixing with intimate contact and only PPE available (PROC 19)	10000.0
ES4 - F2		Formulation - Formulation in materials - Formulation of preparations (ERC 3) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled	5000000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Use as laboratory reagent (PROC 15)	
ES5 - IW1	PC 19	Use at industrial site - Industrial use resulting in manufacture of another substance (use of intermediates) - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC 6a) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Use as laboratory reagent (PROC 15)	1000000.0
ES6 - IW2	PC 19	Use at industrial site - Industrial use of reactive processing aids - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC 6b) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Use as laboratory reagent (PROC 15)	1000000.0
ES7 - IW3	PC 7; PC 14; PC 15; PC 21; PC 35	Use at industrial site - Use in metal and non-metal surface treatment, not becoming part of an article - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of	500000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - Hot work operation with metals (PROC 25)	
ES8 - IW4	PC 7; PC 14; PC 15; PC 21; PC 35	Use at industrial site - Use in metal and non-metal surface treatment, resulting in inclusion in articles - Industrial use resulting in inclusion into or onto a matrix (ERC 5) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Using material as fuel sources, limited exposure to unburned product to be expected (PROC 16) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - Hot work operation with metals (PROC 25)	500000.0
ES9 - IW5	PC 7; PC 14; PC 15; PC 21; PC 35	Use at industrial site - Use in metal and non-metal surface treatment as processing aid - Industrial use of reactive processing aids (ERC 6b) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3)	500000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - Hot work operation with metals (PROC 25)	
ES10 - PW2	PC 7; PC 14; PC 15; PC 21; PC 35	Use by professional worker - Use in metal and non-metal surface treatment - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)	500000.0
ES11 - PW3	PC 7; PC 14; PC 15; PC 21; PC 35	Use by professional worker - Use in metal and non-metal surface treatment - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	500000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)	
ES12 - PW4	PC 7; PC 14; PC 15; PC 21; PC 35	Use by professional worker - Use in metal and non-metal surface treatment - Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix (ERC 8f) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)	500000.0
ES13 - SL-IW1	PC 7; PC 14; PC 15; PC 21; PC 35	Service life (worker at industrial site) - Service life of metal and non-metal articles treated with phosphoric acid - Industrial processing of articles with abrasive techniques (high release); Industrial processing of articles with abrasive techniques (low release) (ERC 12b) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)	500000.0
ES14 - SL-PW1	PC 7; PC 14; PC 15; PC 21; PC 35	Service life (professional worker) - Service life of metal and non-metal articles treated with phosphoric acid, professional setting - Service life of metal and non-metal articles treated with phosphoric acid, professional setting (ERC 10a) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23) - High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)	500000.0
ES15 - IW6	PC 8; PC 31; PC 35; PC 37; PC 0	Use at industrial site - Use in cleaning agents - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for	1000000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	
ES16 - IW7	PC 8; PC 31; PC 35; PC 37; PC 0	Use at industrial site - Use in cleaning agents - Industrial use of reactive processing aids (ERC 6b) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	1000000.0
ES17 - IW8	PC 8; PC 31; PC 35; PC 37; PC 0	Use at industrial site - Use in cleaning agents - Industrial use of substances in closed systems (ERC 7) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	1000000.0
ES18 - PW5	PC 8; PC 31; PC	Use by professional worker - Detergent and cleaning agent - Wide dispersive outdoor use of processing aids in open systems;	1000000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
	35; PC 37; PC 0	Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	
ES19 - PW6	PC 8; PC 31; PC 35; PC 37; PC 0	Use by professional worker - Detergent and cleaning agent - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19)	1000000.0
ES20 - C1	PC 8; PC 31; PC 35; PC 37; PC 0	Consumer Use - Polishes and wax blends - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Polishes and wax blends (PC 31)	1000000.0
ES21 - C2	PC 8; PC 31; PC 35; PC 37; PC 0	Consumer Use - Consumer use of washing and cleaning products - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Washing and cleaning products (PC 35)	1000000.0
ES22 - C3	PC 8; PC 31; PC 35; PC 37; PC 0	Consumer Use - Consumer use of washing and cleaning products - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Washing and cleaning products (PC 35)	1000000.0
ES23 - IW9	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC	Use at industrial site - Processing aid in chemical industry and other industries - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed batch process (synthesis or formulation) (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
	24; PC 25; PC 26; PC 32; PC 33; PC 34; PC 35; PC 37; PC 39	- Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Treatment of articles by dipping and pouring (PROC 13) - Use as laboratory reagent (PROC 15) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	
ES24 - IW10	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC 24; PC 25; PC 26; PC 32; PC 33; PC 34; PC 35; PC 37; PC 39	Use at industrial site - Processing aid in chemical industry and other industries - Industrial use of reactive processing aids (ERC 6b) - Use in closed batch process (synthesis or formulation) (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Treatment of articles by dipping and pouring (PROC 13) - Use as laboratory reagent (PROC 15) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	200000.0
ES25 - IW11	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC 24; PC 25; PC 26; PC 32; PC 33; PC 34; PC 35; PC 37; PC 39	Use at industrial site - Processing aid in chemical industry and other industries, resulting in incorporation in articles - Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers (ERC 6d) - Use in closed batch process (synthesis or formulation) (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Treatment of articles by dipping and pouring (PROC 13) - Use as laboratory reagent (PROC 15)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	
ES26 - IW12	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC 24; PC 25; PC 26; PC 32; PC 33; PC 34; PC 35; PC 37; PC 39	Use at industrial site - Processing aid in chemical industry and other industries - Industrial use of substances in closed systems (ERC 7) - Use in closed batch process (synthesis or formulation) (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Treatment of articles by dipping and pouring (PROC 13) - Use as laboratory reagent (PROC 15) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	200000.0
ES27 - IW13	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC 24; PC 25; PC 26; PC 32; PC 33; PC 34; PC 35; PC 37; PC 39	Use at industrial site - Use of phosphoric acid as a catalyst - Industrial use of reactive processing aids (ERC 6b) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Use as laboratory reagent (PROC 15)	200000.0
ES28 - PW7	PC 1; PC 9a; PC 9b; PC 13; PC 19; PC 20; PC 21; PC 23; PC 24; PC 25; PC 26; PC 32; PC 33;	Use by professional worker - Laboratory use - Wide dispersive indoor use of reactive substances in open systems (ERC 8b) - Use as laboratory reagent (PROC 15)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
	34; PC 35; PC 37; PC 39		
ES29 - IW14	PC 0	Use at industrial site - Use as a phosphate source - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9)	200000.0
ES30 - IW15	PC 0	Use at industrial site - Use as a phosphate source - Use as a phosphate source (ERC 6b) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	200000.0
ES31 - IW16	PC 20; PC 0	Use at industrial site - Use as a binding agent in ceramic materials and refractory products, resulting in incorporation in articles. - Industrial use resulting in inclusion into or onto a matrix (ERC 5) - Spraying in industrial settings and applications (PROC 7) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)	200000.0
ES32 - IW17	PC 20; PC 0	Use at industrial site - Use as a binding agent in ceramic materials and refractory products, resulting in incorporation in articles. - Industrial use of reactive processing aids (ERC 6b) - Spraying in industrial settings and applications (PROC 7) - Roller application or brushing of adhesive and other coating (PROC 10) - Treatment of articles by dipping and pouring (PROC 13) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)	200000.0
ES33 - PW8	PC 20; PC 0	Use by professional worker - Construction Applications - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	
ES34 - PW9	PC 20; PC 0	Use by professional worker - Use as a binding agent in ceramic materials and in refractory products - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Roller application or brushing of adhesive and other coating (PROC 10) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19)	200000.0
ES35 - C4	PC 20; PC 0	Consumer Use - Consumer use as a binding agent in ceramic materials and in refractory products - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Consumer use of products containing phosphoric acid (PC 20)	200000.0
ES36 - SL-PW2	PC 20; PC 0	Service life (professional worker) - Service life of construction articles containing phosphoric acid - Wide dispersive indoor use of long-life articles and materials with low release; Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) (ERC 10a) - Low energy manipulation of substances bound in materials and/or articles (PROC 21) - Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)	200000.0
ES37 - IW18	PC 9a; PC 20; PC 32; PC 0	Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	
ES38 - IW19	PC 9a; PC 20; PC 32; PC 0	Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles - Industrial use resulting in inclusion into or onto a matrix (ERC 5) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	200000.0
ES39 - IW20	PC 9a; PC 20; PC 32; PC 0	Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints - Industrial use of reactive processing aids (ERC 6b) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	200000.0
ES40 - IW21	PC 9a; PC 20; PC 32; PC 0	Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints - Industrial use of substances in closed systems (ERC 7) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	
ES41 - PW10	PC 9a; PC 20; PC 32; PC 0	Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	200000.0
ES42 - PW11	PC 9a; PC 20; PC 32; PC 0	Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	200000.0
ES43 - PW12	PC 9a; PC 20; PC 32; PC 0	Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles - Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix (ERC 8f) - Use in closed process, no likelihood of exposure (PROC 1)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Use in closed, continuous process with occasional controlled exposure (PROC 2) - Use in closed batch process (synthesis or formulation) (PROC 3) - Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Hand-mixing with intimate contact and only PPE available (PROC 19)	
ES44 - SL-PW3	PC 9a; PC 20; PC 32; PC 0	Service life (professional worker) - Service life of plastic articles and resins containing low levels of phosphoric acid (professional workers) - Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) (ERC 11a) - Worker service life contributing scenario [edit] (PROC 21)	200000.0
ES45 - SL-C1	PC 9a; PC 20; PC 32; PC 0	Service life (consumers) - Service life of plastic articles and resins containing low levels of phosphoric acid (consumer use) - Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing) (ERC 11a) - Plastic Articles (AC 13)	200000.0
ES46 - IW22	PC 16; PC 20; PC 36; PC 37	Use at industrial site - Use in water and wastewater treatment - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Handling of solid inorganic substances at ambient temperature. (PROC 26)	200000.0
ES47 - IW23	PC 16; PC 20; PC 36; PC 37	Use at industrial site - Use in water and wastewater treatment - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC 6a) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Handling of solid inorganic substances at ambient temperature. (PROC 26)	
ES48 - IW24	PC 16; PC 20; PC 36; PC 37	Use at industrial site - Use in water and wastewater treatment - Industrial use of substances in closed systems (ERC 7) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Spraying in industrial settings and applications (PROC 7) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22) - Handling of solid inorganic substances at ambient temperature. (PROC 26)	200000.0
ES49 - PW13	PC 16; PC 20; PC 36; PC 37	Use by professional worker - Use in water and wastewater treatment - Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems (ERC 8d) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Spraying outside industrial settings and/or applications (PROC 11) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)	200000.0
ES50 - PW14	PC 16; PC 20; PC 36; PC 37	Use by professional worker - Use in water and wastewater treatment - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Spraying outside industrial settings and/or applications (PROC 11)	200000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)	
ES51 - PW15	PC 16; PC 20; PC 36; PC 37	Use by professional worker - Use in water and wastewater treatment - Wide dispersive outdoor use of substances in closed systems; Wide dispersive indoor use of substances in closed systems (ERC 9b) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Calendering operations (PROC 6) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Spraying outside industrial settings and/or applications (PROC 11) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)	200000.0
ES52 - IW25	PC 24	Use at industrial site - Use of lubricants in high energy open processes - Industrial use of processing aids in processes and products, not becoming part of articles (ERC 4) - Use in closed process, no likelihood of exposure (PROC 1) - Use in closed, continuous process with occasional controlled exposure (PROC 2) - Transfer from/pouring from containers (PROC 8b) - Lubrication at high energy conditions and in partly open process (PROC 17)	200000.0
ES53 - PW16	PC 12	Use by professional worker - Use of fertilisers containing phosphoric acid - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5) - Transfer from/pouring from containers (PROC 8a) - Transfer from/pouring from containers (PROC 8b) - Transfer from/pouring from containers (PROC 9) - Spraying outside industrial settings and/or applications (PROC 11) - Treatment of articles by dipping and pouring (PROC 13) - Use as laboratory reagent (PROC 15) - Hand-mixing with intimate contact and only PPE available (PROC 19)	6000000.0
ES54 - C5	PC 12	Consumer Use - Fertilizers - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Fertilisers (PC 12)	6000000.0
ES55 - PW17	PC 38	Use by professional worker - Soldering aid: Use of phosphoric acid as a flux agent for soldering.	100000.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
		- Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Roller application or brushing (PROC 10) - Hand-Mixing with intimate contact. Use of phosphoric acid as a soldering flux in liquid form. (PROC 19)	
ES56 - C6	PC 38	Consumer Use - Welding and soldering products, (with flux coatings or flux cores), flux products - Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems (ERC 8e) - Flux products (PC 38)	100000.0
ES57 - PW18	PC 2	Use by professional worker - Use in PPE cartridges - Wide dispersive indoor use resulting in inclusion into or onto a matrix (ERC 8c) - Use in closed batch process (synthesis or formulation) (PROC 3) - Transfer from/pouring from containers (PROC 9)	100000.0
ES58 - SL-PW4	PC 2	Service life (professional worker) - Use of PPE cartridge - Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing); Wide dispersive indoor use of long-life articles and materials with low release (ERC 10a) - Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 0) - Low energy manipulation of substances bound in materials and/or articles (PROC 21)	100000.0
ES59 - PW19	PC 0	Use by professional worker - Professional use in orthodontic and dental products - Wide dispersive indoor use of reactive substances in open systems (ERC 8b) - Hand-mixing with intimate contact and only PPE available (PROC 19) - Mixing and/or application of dental orthodontic materials (PROC 0)	100000.0
ES60 - PW20	PC 27	Use by professional worker - Plant protection products Generic Exposure Scenario 1: Spray application of plant protection products containing co-formulants (indoor or outdoor) - Wide dispersive use of processing aids (ERC 8d) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b) - Non industrial spraying (PROC 11)	200.0
ES61 - PW21	PC 27	Use by professional worker - Plant protection products Generic Exposure Scenario 2: Direct application of plant protection products (granules or treated seeds) containing co-formulants to soil (indoor or outdoor) - Wide dispersive use of processing aids (ERC 8d) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a) - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	200.0

Identifiers	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage (tonnes per year)
ES62 - C7	PC 27	Consumer Use - Use in plant protection products (under Regulation 1107/2009) - Wide dispersive use of processing aids (ERC 8d) - Plant Protection Products (PC 27) - Plant Protection Products (PC 27)	200.0
Manufacture: M-#, Formulation: F-#, Industrial end use at site: IW-#, Professional end use: PW-#, Consumer end use: C-#, Service life (by workers in industrial site): SL-IW-#, Service life (by professional workers): SL-PW-#, Service life (by consumers): SL-C-#.)			

9.0.2. Introduction to the assessment

9.0.2.1. Environment

Scope and type of assessment

Exposure assessment and risk characterization are not required for the environment as no hazard has been identified for the environment.

9.0.2.2. Man via environment

Scope and type of assessment

The exposure assessment for man via environment is not needed.

Indirect exposure of humans via the environment is not expected for phosphoric acid as this substance in its pure form does not exist in the environment due to the pH effect (see environmental exposure). Exposure to phosphoric acid due to environmental releases is only relevant at the local scale, where phosphoric acid exerts a pH effect resulting in a local pH of around 3. Any pH effect of local releases will be neutralised in the receiving water at the regional scale due to the differences in volume. Additionally, bioaccumulation is not relevant for such highly soluble and dissociating inorganic substance. Therefore, indirect exposure of humans via the environment (oral) is not relevant in the case of phosphoric acid.

9.0.2.3. Workers

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for workers are described in the following table based on the hazard conclusions presented in section 5.11.

Table 45. Type of risk characterisation required for workers

Route	Type of effect	Type of risk characterisation	Hazard conclusion (see section 5.11)
Inhalation	Systemic, long-term	Quantitative	DNEL (Derived No Effect Level) = 10.7 mg/m³
	Systemic, acute	Qualitative	Hazard unknown (no further information necessary)
	Local, long-term	Semi-quantitative	Other toxicological threshold = 1 mg/m³
	Local, acute	Semi-quantitative	Other toxicological threshold = 2 mg/m³
Dermal	Systemic, long-term	Qualitative	Hazard unknown (no further information necessary)
	Systemic, acute	Qualitative	Hazard unknown (no further information necessary)
	Local, long-term	Qualitative	Medium hazard (no threshold derived)
	Local, acute	Qualitative	Medium hazard (no threshold derived)
Eye	Local	Qualitative	Medium hazard (no threshold derived)

Comments on assessment approach related to toxicological hazard:

Phosphoric acid can be locally absorbed by ingestion, inhalation and dermal contact. Once absorbed, phosphoric acid is distributed widely in the body as phosphate, which is essential element to organisms and its fate in the human body is regulated. Therefore, systemic effects of phosphoric acid after dermal or inhalation exposure are not expected to occur.
No measured workplace inhalation data are available for phosphoric acid. Therefore, modelled data estimated via ECETOC TRA or MEASE are used to characterise the long-term exposure of workers to phosphoric acid.

Comments on assessment approach related to physicochemical hazard:

Phosphoric acid is a corrosive substance. For the handling of corrosive substances and formulations direct dermal contact is anticipated to occur only accidentally (splashes, etc) as the wearing of gloves and skin protection is mandatory. Direct contact is forbidden and therefore it is assumed that on the basis of a qualitative assessment of potential dermal exposure that for the purpose of risk assessment dermal exposure can be discounted. Ocular exposure is possible due to hand-eye contact but this is not quantified. Generally, ocular exposure is prevented as wearing of safety goggles is required due to the corrosive nature of the substance.

General information on risk management related to toxicological hazard:

Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent. The wearing of chemically resistant gloves conforming to EN374 is also required when handling corrosive substances and mixtures.

General information on risk management related to physicochemical hazard:

Store in a corrosive resistant container with a resistant inner lining. Keep only in original container. Absorb spillage to prevent material damage.

9.0.2.4. Consumers

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for consumers are described in the following table based on the hazard conclusions presented in section 5.11.

Table 46. Type of risk characterisation required for consumers

Route	Type of effect	Type of risk characterisation	Hazard conclusion (see section 5.11)
Inhalation	Systemic, long-term	Quantitative	DNEL (Derived No Effect Level) = 4.57 mg/m³
	Systemic, acute	Qualitative	Hazard unknown (no further information necessary)
	Local, long-term	Quantitative	DNEL (Derived No Effect Level) = 0.36 mg/m³
	Local, acute	Qualitative	Medium hazard (no threshold derived)
Dermal	Systemic, long-term	Qualitative	Hazard unknown (no further information necessary)
	Systemic, acute	Qualitative	Hazard unknown (no further information necessary)
	Local, long-term	Qualitative	Medium hazard (no threshold derived)
	Local, acute	Qualitative	Medium hazard (no threshold derived)
Eye	Local	Qualitative	Medium hazard (no threshold derived)
Oral	Systemic, long-term	Quantitative	DNEL (Derived No Effect Level) = 0.1 mg/kg bw/day

Comments on assessment approach:

Consumer products should be intrinsically safe, therefore products containing phosphoric acid should be designed to avoid accidents and in case an accident occurs, instructions should be available how to minimise the effects. Risk management measures in place relate to the design of the consumer product and to consumers use. It is required that recommended use instructions, and product information should always be provided to the consumers. This will considerably reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of phosphoric acid, instructions for use should contain a warning against dangerous mixtures.

9.1. Exposure scenario 1: Manufacture - Manufacture of substance

Environment contributing scenario(s):	
Manufacture of substance	ERC 1
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

Manufacture of phosphoric acid, including manufacture of phosphoric acid as an intermediate

Explanation on the approach taken for the ES

The amount used per worker varies from activity to activity. European manufacturers of phosphoric acid have provided relevant information on common operational conditions and industrial settings. Based on the information received, the maximum duration considered for this exposure scenario is a working shift of > 4 hours/day (can in some cases be up to 12h/day (maximum, worst-case)). Workers will not be subject to continuous actual or potential exposure during a 12-hour working shift.

Production sites usually manufacture liquid phosphoric acid with a typical concentration of 75%, therefore for the purpose of risk assessment the default value >25% will be used. As a worst case the pure liquid is selected as the main assessment.

9.1.1. Environmental contributing scenario 1: Manufacture of substance

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.1.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.1.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced *Workers in the identified risky process/areas should be trained a) to use the appropriate PPE (including personal respiratory equipment) b) to understand the corrosive properties and, especially, the respiratory inhalation effects of phosphoric acid and c) to follow 'safe procedures' as instructed by the employer*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Containment: Closed system (minimal contact during routine operations)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C *Process occurs at ambient temperatures*	External Tool (MEASE)
• Place of use: Indoor	External Tool (MEASE)

9.1.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 47. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.04 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.1.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.1.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed continuous process with occasional controlled exposure	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency of 90%. Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C *Ambient temperature*	External Tool (MEASE)

9.1.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 48. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.1.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.1.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: Closed batch process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.1.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 49. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety

assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.1.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.1.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.1.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 50. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.1.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8b)

9.1.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure liquid, Low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.1.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 51. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.601 mg/m³ (External Tool (MEASE))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.601 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 1.202 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'Liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile
- Inhalation, local, long-term:
  90th percentile
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled without the need for LEV or PRE.

An initial tier 1 assessment showed that LEV might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.1.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 9)

9.1.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.1.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 52. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.1.8. Worker contributing scenario 7: Use as laboratory reagent (PROC 15)

9.1.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.1.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 53. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:

Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2. Exposure scenario 2: Formulation - Formulation of preparations

Environment contributing scenario(s):	
Formulation of preparations	ERC 2
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Use as laboratory reagent	PROC 15
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

Formulation of mixtures, includes re-packaging and distribution

ES Short Title for ES communication: Formulation including mixing, handling, repacking; various products; ERC 2

Explanation on the approach taken for the ES

Formulation and synthesis: Phosphoric acid is mainly used in closed continuous processes with normal activities as described for manufacturing (i.e. loading, unloading, sampling, etc.). Open batch processes are also considered.
Exposure estimates are calculated for the pure liquid as a worst-case. Aqueous solutions are anticipated to result in lower exposure levels.

9.2.1. Environmental contributing scenario 1: Formulation of preparations

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.2.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced *Workers in the identified risky process/areas should be trained a) to use the appropriate PPE (including personal respiratory equipment) b) to understand the corrosive properties and, especially, the respiratory inhalation effects of phosphoric acid and c) to follow 'safe procedures' as instructed by the employer*	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Containment: Closed system (minimal contact during routine operations)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C *Process occurs at ambient temperatures*	External Tool (MEASE)
• Place of use: Indoor	External Tool (MEASE)

9.2.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 54. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.04 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.2.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.2.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed continuous process with occasional controlled exposure	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency of 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C *Ambient temperature*	External Tool (MEASE)

9.2.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 55. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.2.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed batch process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.2.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 56. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.2.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.2.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 57. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be

used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.2.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.2.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 58. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8a)

9.2.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.2.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 59. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8b)

9.2.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.2.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 60. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.601 mg/m³ (External Tool (MEASE))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.601 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 1.202 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile

- Inhalation, local, long-term:
  90th percentile

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled without the need for LEV or PRE.

An initial tier 1 assessment showed that LEV might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 9)

9.2.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with	

	Method
basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.2.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 61. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be

consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.10. Worker contributing scenario 9: Use as laboratory reagent (PROC 15)

9.2.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.2.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 62. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.2.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.2.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 1 hour	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *LEV not a relevant RMM for hand-mixing. Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.2.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 63. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:

Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter) and a reduction of the activity time to < 1 hour.

Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3. Exposure scenario 3: Use by professional worker - Formulation & (re)packing of substances and mixtures

Sector of use:
SU 1, Agriculture, forestry, fishery
SU 10, Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Use as laboratory reagent	PROC 15
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 12, PC 14, PC 20, PC 35, PC 38); various sectors (SU 1, SU 10), ERC 8a, ERC 8d

Explanation on the approach taken for the ES

Formulation and synthesis: Phosphoric acid is mainly used in closed continuous processes with normal activities as described for manufacturing (i.e. loading, unloading, sampling, etc.). Open batch processes are also considered.
Exposure estimates are calculated for the pure liquid as a worst-case. Aqueous solutions are anticipated to result in lower exposure levels.

9.3.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.3.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.3.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% High purity liquid phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 64. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.
Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3.3. Worker contributing scenario 2: Transfer from/pouring from containers (PROC 8a)

9.3.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% High purity liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 65. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.501 mg/m³** (External Tool (MEASE))	RCR = 0.047
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.501 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.501 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.501 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.047

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be

used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8b)

9.3.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 97% High purity liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 66. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 9)

9.3.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% High purity liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 67. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3.6. Worker contributing scenario 5: Use as laboratory reagent (PROC 15)

9.3.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% High purity liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 68. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves

Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.3.7. Worker contributing scenario 6: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.3.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *High purity liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 15 minutes	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Good general ventilation (3-5 air changes per hour) *High purity liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *High purity liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.3.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 69. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.501 mg/m³** (External Tool (MEASE))	RCR = 0.047
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.501 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.501 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.501

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.047

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by a reduction of the activity time to < 15 minutes.

Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4. Exposure scenario 4: Formulation - Formulation in materials

Environment contributing scenario(s):	
Formulation of preparations	ERC 3
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

Formulation of mixtures and materials/articles, includes re-packaging and distribution.

ES Short Title for ES communication: Formulation including mixing, handling, repacking; various products; ERC 3

Explanation on the approach taken for the ES

Formulation and synthesis: Phosphoric acid is mainly used in closed continuous processes with normal activities as described for manufacturing (i.e. loading, unloading, sampling, etc.). Open batch processes are also considered.
Exposure estimates are calculated for the pure liquid as a worst-case. Aqueous solutions are anticipated to result in lower exposure levels.

9.4.1. Environmental contributing scenario 1: Formulation of preparations

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.4.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.4.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced *Workers in the identified risky process/areas should be trained a) to use the appropriate PPE (including personal respiratory equipment) b) to understand the*	External Tool (MEASE)

	Method
corrosive properties and, especially, the respiratory inhalation effects of phosphoric acid and c) to follow 'safe procedures' as instructed by the employer	
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Containment: Closed system (minimal contact during routine operations)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C *Process occurs at ambient temperatures*	External Tool (MEASE)
• Place of use: Indoor	External Tool (MEASE)

9.4.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 70. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.04 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety

assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.4.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.4.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed continuous process with occasional controlled exposure	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency of 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C *Ambient temperature*	External Tool (MEASE)

9.4.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 71. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.4.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed batch process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.4.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 72. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.4.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.4.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 73. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be

consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.4.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% Liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.4.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 74. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.4.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such	External Tool (ART 1.0)

	Method
Pure Liquid, low viscosity	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No	External Tool (ART 1.0)
• General ventilation: Good general ventilation (3-5 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Fixed capturing hood (90% reduction) and secondary containment in the form of other LEV systems (50% reduction). Pure Liquid, low viscosity.*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *No PRE selected. Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor *Any size room.*	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature defined as 15-25°C*	External Tool (ART 1.0)

9.4.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 75. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.48 mg/m³** (External Tool (ART 1.0))	RCR = 0.045
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.48 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.48 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.96 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.48 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.045

Remarks on exposure data

External Tool (ART 1.0)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled by the use of LEV.
An initial tier 1 assessment showed that additional PRE might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.4.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.4.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 76. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.4.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.4.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 77. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile
- Inhalation, local, long-term:
  90th percentile
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled without the need for LEV or PRE.

An initial tier 1 assessment showed that LEV might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.4.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.4.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 78. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.11. Worker contributing scenario 10: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.4.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.4.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 79. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.4.12. Worker contributing scenario 11: Use as laboratory reagent (PROC 15)

9.4.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.4.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 80. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5. Exposure scenario 5: Use at industrial site - Industrial use resulting in manufacture of another substance (use of intermediates)

Market sector: Chemical synthesis
PC 19: Intermediate

Sector of use:
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals

Environment contributing scenario(s):	
Industrial use resulting in manufacture of another substance (use of intermediates)	ERC 6a
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; intermediate (PC 19); various sectors (SU 8, SU 9); ERC 6a

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the chemical synthesis where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered.
Exposure estimates are calculated for the pure liquid as a worst-case. Aqueous solutions are anticipated to result in lower exposure levels.

9.5.1. Environmental contributing scenario 1: Industrial use resulting in manufacture of another substance (use of intermediates)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.5.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.5.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
liquid phosphoric acid	
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Containment: Closed system (minimal contact during routine operations)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C *Process occurs at ambient temperatures*	External Tool (MEASE)
• Place of use: Indoor	External Tool (MEASE)

9.5.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 81. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.04 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance

with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.5.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.5.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed continuous process with occasional controlled exposure	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency of 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C *Ambient temperature*	External Tool (MEASE)

9.5.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 82. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.4. Worker contributing scenario 3: Use in closed batch process (synthesis or

formulation) (PROC 3)

9.5.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed batch process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.5.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 83. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.5.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.5.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 84. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8a)

9.5.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.5.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 85. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8b)

9.5.7.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.5.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 86. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile

- Inhalation, local, long-term:
  90th percentile

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled without the need for LEV or PRE.

An initial tier 1 assessment showed that LEV might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 9)

9.5.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.5.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 87. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.9. Worker contributing scenario 8: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.5.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.5.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 88. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.5.10. Worker contributing scenario 9: Use as laboratory reagent (PROC 15)

9.5.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.5.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 89. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6. Exposure scenario 6: Use at industrial site - Industrial use of reactive processing aids

Market sector: Chemical synthesis
PC 19: Intermediate

Sector of use:
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals

Environment contributing scenario(s):	
Industrial use resulting in manufacture of another substance (use of intermediates)	ERC 6b
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various sectors (SU 8, SU 9); ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the chemical synthesis where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered.
Exposure estimates are calculated for the pure liquid as a worst-case. Aqueous solutions are anticipated to result in lower exposure levels.

9.6.1. Environmental contributing scenario 1: Industrial use resulting in manufacture of another substance (use of intermediates)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.6.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.6.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Containment: Closed system (minimal contact during routine operations)	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C *Process occurs at ambient temperatures*	External Tool (MEASE)
• Place of use: Indoor	External Tool (MEASE)

9.6.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 90. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.04 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.6.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.6.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed continuous process with occasional controlled exposure	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency of 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C *Ambient temperature*	External Tool (MEASE)

9.6.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 91. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.6.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Closed batch process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.6.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 92. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.12 mg/m³** (External Tool (MEASE))	RCR = 0.011
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.011

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as a 'liquid' in MEASE

- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE

- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.6.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.6.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 93. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8a)

9.6.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.6.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 94. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.401 mg/m³** (External Tool (MEASE))	RCR = 0.037
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.401 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.401 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.802 mg/m³** (External Tool (MEASE))	>>>**CAUTION:** Risk not controlled (based on semi-quantitative risk characterisation) <<<

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8b)

9.6.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)

	Method
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.6.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 95. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile
- Inhalation, local, long-term:
  90th percentile

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

A tier 2 assessment shows that risks are adequately controlled without the need for LEV or PRE.

An initial tier 1 assessment showed that LEV might be necessary to control exposure therefore workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 9)

9.6.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure *liquid phosphoric acid*	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)

9.6.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 96. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.9. Worker contributing scenario 8: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.6.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.6.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 97. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.6.10. Worker contributing scenario 9: Use as laboratory reagent (PROC 15)

9.6.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Liquid phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: Semi-closed process with occasional controlled exposure	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *liquid phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 90% liquid phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *liquid phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (MEASE)
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.6.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 98. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (External Tool (MEASE))	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.7. Exposure scenario 7: Use at industrial site - Use in metal and non-metal surface treatment, not becoming part of an article

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
Hot work operation with metals	PROC 25

Description of the activities and technical processes covered in the exposure scenario:

Phosphoric acid used alone or in mixtures in "open" industrial applications for metal cleaning, polishing, rust removal, corrosion protection, finishing.

ES Short Title for ES communication: Use at industrial sites; various products (PC 7, PC 14, PC 15, PC 21, PC 35); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 4

Explanation on the approach taken for the ES

Use in metal and non-metal surface treatment, open applications in industrial settings for metal cleaning, polishing, rust removal, corrosion, finishing (e.g. cleaning chips, plasma screens, car industry, aircraft and aerospace industries.)
This scenario covers all industrial activities related to the mentioned applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered.
Phosphoric acid is predominantly supplied to this use in aqueous solutions of varying concentrations. Therefore an assessment is made for aqueous solutions of phosphoric acid at >25%.

9.7.1. Environmental contributing scenario 1: Industrial use of processing aids in

processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.7.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.7.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 99. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.3. Worker contributing scenario 2: Use in closed batch process (synthesis or formulation) (PROC 3)

9.7.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
Aqueous solutions of phosphoric acid	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 100. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.4. Worker contributing scenario 3: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.7.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 101. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.5. Worker contributing scenario 4: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.7.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 102. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.6. Worker contributing scenario 5: Spraying in industrial settings and applications (PROC 7)

9.7.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 103. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.7.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8a)

9.7.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 104. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:

Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8b)

9.7.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 105. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 9)

9.7.9.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 106. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.10. Worker contributing scenario 9: Roller application or brushing of adhesive and other coating (PROC 10)

9.7.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 107. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.7.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 108. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.12. Worker contributing scenario 11: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.7.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.7.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 109. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.7.13. Worker contributing scenario 12: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.7.13.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Solid phosphoric acid*	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.7.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 110. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.7.14. Worker contributing scenario 13: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.7.14.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.7.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 111. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.7.15. Worker contributing scenario 14: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.7.15.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.7.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 112. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.7.16. Worker contributing scenario 15: Hot work operation with metals (PROC 25)

9.7.16.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.7.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 113. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.07 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.07 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.07 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.28 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.8. Exposure scenario 8: Use at industrial site - Use in metal and non-metal surface treatment, resulting in inclusion in articles

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Industrial use resulting in inclusion into or onto a matrix	ERC 5
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Using material as fuel sources, limited exposure to unburned product to be expected	PROC 16
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
Hot work operation with metals	PROC 25

Description of the activities and technical processes covered in the exposure scenario:

Phosphoric acid used alone or in mixtures in "open" industrial applications for metal cleaning, polishing, rust removal, corrosion protection, adsorption enhancement, finishing. Phosphoric acid is used as a protective coating and oxidation inhibitor.

ES Short Title for ES communication: Use at industrial sites; various sectors (SU 14, SU 15, SU 16, SU 17); ERC 5

Explanation on the approach taken for the ES

Use in metal and non-metal surface treatment, open applications in industrial settings for metal cleaning, polishing, rust removal, corrosion, finishing (e.g. cleaning chips, plasma screens, car industry, aircraft and aerospace industries.)
This scenario covers all industrial activities related to the mentioned applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered.

Phosphoric acid is predominantly supplied to this use in aqueous solutions of varying concentrations. Therefore an assessment is made for aqueous solutions of phosphoric acid at >25%.

9.8.1. Environmental contributing scenario 1: Industrial use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.8.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.8.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 114. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.3. Worker contributing scenario 2: Use in closed batch process (synthesis or formulation) (PROC 3)

9.8.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 115. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.4. Worker contributing scenario 3: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.8.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 116. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.5. Worker contributing scenario 4: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.8.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 117. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.6. Worker contributing scenario 5: Spraying in industrial settings and applications (PROC 7)

9.8.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 118. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.8.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8a)

9.8.7.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 119. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8b)

9.8.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 120. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 9)

9.8.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 121. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.10. Worker contributing scenario 9: Roller application or brushing of adhesive and other coating (PROC 10)

9.8.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 122. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.8.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 123. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.12. Worker contributing scenario 11: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.8.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 124. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.13. Worker contributing scenario 12: Using material as fuel sources, limited exposure to unburned product to be expected (PROC 16)

9.8.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 125. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.14. Worker contributing scenario 13: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.8.14.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.8.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 126. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

For aqueous solutions >25% the risks are adequately controlled without the need for LEV or PRE.

9.8.15. Worker contributing scenario 14: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.8.15.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Solid phosphoric acid*	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.8.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 127. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.8.16. Worker contributing scenario 15: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.8.16.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.8.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 128. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.8.17. Worker contributing scenario 16: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.8.17.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.8.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 129. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.8.18. Worker contributing scenario 17: Hot work operation with metals (PROC 25)

9.8.18.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.8.18.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 130. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.07 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.07 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.07 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.28 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

Risks are adequately controlled without the need for LEV or PRE.

9.9. Exposure scenario 9: Use at industrial site - Use in metal and non-metal surface treatment as processing aid

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
Hot work operation with metals	PROC 25

Description of the activities and technical processes covered in the exposure scenario:

phosphoric acid used alone or in mixtures in "open" industrial applications for metal cleaning, polishing, rust removal, corrosion protection, finishing. Phosphoric acid is used as a protective coating and oxidation inhibitor.

ES Short Title for ES communication: Use at industrial sites; various sectors (SU 14, SU 15, SU 16, SU 17); ERC 6b

Explanation on the approach taken for the ES

Use in metal and non-metal surface treatment, open applications in industrial settings for metal cleaning, polishing, rust removal, corrosion, finishing (e.g. cleaning chips, plasma screens, car industry, aircraft and aerospace industries.)
This scenario covers all industrial activities related to the mentioned applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered.
Phosphoric acid is predominantly supplied to this use in aqueous solutions of varying concentrations. Therefore an assessment is made for aqueous solutions of phosphoric acid at >25%.

Phosphoric acid is predominantly supplied to this use in aqueous solutions of varying concentrations. Therefore an assessment is made for aqueous solutions of phosphoric acid at >25%.

9.9.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.9.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.9.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 131. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.01 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.01 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.04 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
	0.802 mg/m³ (External Tool (MEASE))	
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Closed continuous process with occasional controlled exposure
- Duration of activity: < 8 hours
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.3. Worker contributing scenario 2: Use in closed batch process (synthesis or formulation) (PROC 3)

9.9.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 132. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.01 mg/m³ (TRA Workers 3.0)	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
	0.12 mg/m³ (External Tool (MEASE))	
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.01 mg/m³ (TRA Workers 3.0) 0.12 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.04 mg/m³ (TRA Workers 3.0) 0.24 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Closed batch process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.4. Worker contributing scenario 3: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.9.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 133. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.2 mg/m³ (TRA Workers 3.0) 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]

- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.5. Worker contributing scenario 4: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.9.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 134. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.2 mg/m³ (TRA Workers 3.0) 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.6. Worker contributing scenario 5: Spraying in industrial settings and applications (PROC 7)

9.9.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No	External Tool (ART 1.0)
• General ventilation: Good general ventilation (3-5 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Fixed capturing hood (90% reduction) and secondary containment in the form of other LEV systems (50% reduction). Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *No PRE selected. Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor *Any size room.*	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature defined as 15-25°C*	External Tool (ART 1.0)

9.9.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 135. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.48 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.035 mg/m³ (TRA Workers 3.0) 0.1 mg/m³ (External Tool (MEASE))	RCR = 0.045
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.48 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.035 mg/m³ (TRA Workers 3.0) 0.1 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.48 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.96 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.14 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.48 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.045

Remarks on exposure data

External Tool (ART 1.0)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8a)

9.9.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 136. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.2 mg/m³ (TRA Workers 3.0) 0.802 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves

Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8b)

9.9.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Pure Liquid, low viscosity*	External Tool (ART 1.0)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ART 1.0)
Technical and organisational conditions and measures	
• Containment: No *Low level containment only.*	External Tool (ART 1.0)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Occupational Health and Safety Management System: Advanced	External Tool (ART 1.0)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Pure Liquid, low viscosity*	External Tool (ART 1.0)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ART 1.0)
• Process temperature (for liquid): <= 40 °C *Room temperature assumed to be 15-25°C*	External Tool (ART 1.0)

9.9.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 137. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.005 mg/m³ (TRA Workers 3.0) 0.601 mg/m³ (External Tool (MEASE)) 0.01 mg/m³ (External Tool (MEASE))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.13 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.005 mg/m³ (TRA Workers 3.0) 0.601 mg/m³ (External Tool (MEASE)) 0.01 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.26 mg/m³** (External Tool (ART 1.0)) **Additional data not used for RCR:** 0.02 mg/m³ (TRA Workers 3.0) 1.202 mg/m³ (External Tool (MEASE)) 0.02 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.13 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ART 1.0)

- Inhalation, systemic, long-term:
  90th percentile
- Inhalation, local, long-term:
  90th percentile
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 9)

9.9.9.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 138. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.4 mg/m³ (TRA Workers 3.0) 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.10. Worker contributing scenario 9: Roller application or brushing of adhesive and other coating (PROC 10)

9.9.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 139. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.2 mg/m³ (TRA Workers 3.0) 0.802 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.9.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 140. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.401 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.4 mg/m³ (TRA Workers 3.0) 0.802 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.12. Worker contributing scenario 11: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.9.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 141. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
	Additional data not used for RCR: 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.4 mg/m³ (TRA Workers 3.0) 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor

- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.13. Worker contributing scenario 12: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.9.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	

	Method
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.9.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 142. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.05 mg/m³ (TRA Workers 3.0) 0.401 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.2 mg/m³ (TRA Workers 3.0) 0.802 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: No

- Duration of activity: < 1 hour
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.14. Worker contributing scenario 13: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.9.14.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Solid phosphoric acid*	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0

	Method
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.9.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 143. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.15. Worker contributing scenario 14: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.9.15.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.9.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 144. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.16. Worker contributing scenario 15: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.9.16.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.9.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 145. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.9.17. Worker contributing scenario 16: Hot work operation with metals (PROC 25)

9.9.17.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.9.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 146. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.07 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.07 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.07 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.28 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10. Exposure scenario 10: Use by professional worker - Use in metal and non-metal surface treatment

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
High (mechanical) energy work-up of substances bound in materials and/or articles	PROC 24

Description of the activities and technical processes covered in the exposure scenario:

Phosphoric acid used in mixtures in ‘open’ professional applications for metal cleaning, polishing, rust removal, corrosion protection, finishing including use as a protective coating and oxidation inhibitor.

ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8a, ERC 8d

Explanation on the approach taken for the ES

Exposure Scenario covers the use of phosphoric acid in metal surface treatment use of diluted phosphoric acid for rust removal by professionals.

9.10.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.10.2. Worker contributing scenario 1: Roller application or brushing of adhesive and other coating (PROC 10)

9.10.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.10.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 147. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.3. Worker contributing scenario 2: Spraying outside industrial settings and/or applications (PROC 11)

9.10.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.10.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 148. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.4. Worker contributing scenario 3: Treatment of articles by dipping and pouring (PROC 13)

9.10.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.10.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 149. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.5. Worker contributing scenario 4: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.10.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.10.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 150. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.6. Worker contributing scenario 5: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.10.6.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.10.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 151. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.72 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.028

Remarks on exposure data

External Tool (MEASE)

- Inhalation, local, acute:

Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.7. Worker contributing scenario 6: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.10.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.10.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 152. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.18 mg/m³** (TRA Workers 3.0)	RCR = 0.017
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.18 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.18 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.72 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.36 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.017

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.10.8. Worker contributing scenario 7: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)

9.10.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 75%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.10.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 153. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.45 mg/m³** (TRA Workers 3.0)	RCR = 0.042
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.45 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.45 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.9 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.042

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11. Exposure scenario 11: Use by professional worker - Use in metal and non-metal surface treatment

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
High (mechanical) energy work-up of substances bound in materials and/or articles	PROC 24

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

Exposure Scenario covers the use of phosphoric acid in metal surface treatment use of diluted phosphoric acid for rust removal by professionals.

9.11.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.11.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.11.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 154. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.06 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.3. Worker contributing scenario 2: Roller application or brushing of adhesive and other coating (PROC 10)

9.11.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 155. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.4. Worker contributing scenario 3: Spraying outside industrial settings and/or applications (PROC 11)

9.11.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 156. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.5. Worker contributing scenario 4: Treatment of articles by dipping and pouring (PROC 13)

9.11.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 157. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.6. Worker contributing scenario 5: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.11.6.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 158. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.7. Worker contributing scenario 6: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.11.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.11.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 159. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.72 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.028

Remarks on exposure data

External Tool (MEASE)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.8. Worker contributing scenario 7: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.11.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.11.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 160. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.18 mg/m³** (TRA Workers 3.0)	RCR = 0.017
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.18 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.18 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.72 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.36 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.017

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.11.9. Worker contributing scenario 8: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)

9.11.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 75%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.11.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 161. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.45 mg/m³** (TRA Workers 3.0)	RCR = 0.042
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.45 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.45

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.9 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.042

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12. Exposure scenario 12: Use by professional worker - Use in metal and non-metal surface treatment

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix	ERC 8f, ERC 8c
Worker contributing scenario(s):	
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
High (mechanical) energy work-up of substances bound in materials and/or articles	PROC 24

Description of the activities and technical processes covered in the exposure scenario:

Phosphoric acid used in mixtures in ‘open’ professional applications for metal cleaning, polishing, rust removal, corrosion protection, finishing including use as a protective coating and oxidation inhibitor

ES Short Title for ES communication: Use by professional workers; metal surface treatment products, including galvanic and electroplating products (PC 14); various sectors (SU 14, SU 15, SU 16, SU 17); ERC 8c, ERC 8f

Explanation on the approach taken for the ES

Exposure Scenario covers the use of phosphoric acid in metal surface treatment use of diluted phosphoric acid for rust removal by professionals.

9.12.1. Environmental contributing scenario 1: Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.12.2. Worker contributing scenario 1: Roller application or brushing of adhesive and other coating (PROC 10)

9.12.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.12.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 162. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.3. Worker contributing scenario 2: Spraying outside industrial settings and/or applications (PROC 11)

9.12.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.12.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 163. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.4. Worker contributing scenario 3: Treatment of articles by dipping and pouring (PROC 13)

9.12.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.12.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 164. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.5. Worker contributing scenario 4: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.12.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.12.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 165. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.6. Worker contributing scenario 5: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.12.6.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.12.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 166. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.3 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.18 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.72 mg/m³ (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.028

Remarks on exposure data

External Tool (MEASE)

- Inhalation, local, acute:

Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.7. Worker contributing scenario 6: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.12.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.12.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 167. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.18 mg/m³** (TRA Workers 3.0)	RCR = 0.017
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.18 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.18 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.72 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.36 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.017

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.12.8. Worker contributing scenario 7: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)

9.12.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 75%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.12.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 168. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.15 mg/m³** (TRA Workers 3.0)	RCR = 0.014
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.15 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.15 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.014

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.13. Exposure scenario 13: Service life (worker at industrial site) - Service life of metal and non-metal articles treated with phosphoric acid

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Article categories:
AC 2, Machinery, mechanical appliances, electrical/electronic articles (Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)
AC 7, Metal articles (Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)

Environment contributing scenario(s):	
Industrial processing of articles with abrasive techniques (high release); Industrial processing of articles with abrasive techniques (low release)	ERC 12b, ERC 12a
Worker contributing scenario(s):	
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
High (mechanical) energy work-up of substances bound in materials and/or articles	PROC 24

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Service life (worker), various articles (AC 2, AC 7); ERC 12a, ERC 12b

9.13.1. Environmental contributing scenario 1: Industrial processing of articles with abrasive techniques (high release); Industrial processing of articles with abrasive techniques (low release)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.13.2. Worker contributing scenario 1: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.13.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0

	Method
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.13.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 169. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.02 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.02 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.02 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.08 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.04 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.

If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.13.3. Worker contributing scenario 2: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.13.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.13.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 170. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.13.4. Worker contributing scenario 3: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.13.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.13.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 171. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.13.5. Worker contributing scenario 4: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)

9.13.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0

	Method
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.13.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 172. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.14 mg/m³** (TRA Workers 3.0)	RCR = 0.013
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.14 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.14 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.56 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.28 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.013

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.14. Exposure scenario 14: Service life (professional worker) - Service life of metal and non-metal articles treated with phosphoric acid, professional setting

Market sector: Surface treatment applications
PC 7: Base metals and alloys; PC 14: Metal surface treatment products, including galvanic and electroplating products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory Chemicals; PC 35: Washing and Cleaning Products (including solvent based products)

Sector of use:
SU 14, Manufacture of basic metals, including alloys
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Article categories:
AC 2, Machinery, mechanical appliances, electrical/electronic articles (Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)
AC 7, Metal articles (Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)

Environment contributing scenario(s):	
Service life of metal and non-metal articles treated with phosphoric acid, professional setting	ERC 10a, ERC 11a
Worker contributing scenario(s):	
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23
High (mechanical) energy work-up of substances bound in materials and/or articles	PROC 24

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Service life (worker), various articles (AC 2, AC 7), ERC 10a, ERC 11a

9.14.1. Environmental contributing scenario 1: Service life of metal and non-metal articles treated with phosphoric acid, professional setting

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.14.2. Worker contributing scenario 1: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.14.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Solid phosphoric acid*	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0

	Method
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.14.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 173. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.06 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.06 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves

Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.14.3. Worker contributing scenario 2: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.14.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.14.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 174. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.06 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.06 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.24 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.12 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.14.4. Worker contributing scenario 3: High (mechanical) energy work-up of substances bound in materials and/or articles (PROC 24)

9.14.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 75%] *Solid phosphoric acid*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.14.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 175. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.15 mg/m³** (TRA Workers 3.0)	RCR = 0.014
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.15 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.15 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.014

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
o material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.15. Exposure scenario 15: Use at industrial site - Use in cleaning agents

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Sector of use:
SU 4, Manufacture of food products (NACE Code C10: Manufacture of food products)
SU 20, Health services (NACE Code C10: Manufacture of food products)
SU 0, Other (NACE Code C10: Manufacture of food products)

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 8, PC 35); various sectors (SU 4, SU 20, SU 0: other: NACE Code C10: manufacture of food products); ERC 4

Explanation on the approach taken for the ES

The use of phosphoric acid as a cleaning agent includes cleaning agent for equipment and facilities in food and agro-food industry and other industries where industrial spraying, transfer of substance, roller application and brushing operations are considered. Typically in a cleaning scenario phosphoric acid is diluted (commonly 5-15% solutions of phosphoric acid), therefore an assessment for concentrations up to 25% is made in this scenario.

9.15.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.15.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.15.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 176. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.15.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 177. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.15.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 178. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

9.15.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.15.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 179. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.15.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 180. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.15.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 181. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be

used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.15.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.15.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 182. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.15.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 183. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.15.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 184. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.11. Worker contributing scenario 10: Roller application or brushing of adhesive and other coating (PROC 10)

9.15.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 185. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.12. Worker contributing scenario 11: Treatment of articles by dipping and pouring (PROC 13)

9.15.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 186. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.15.13. Worker contributing scenario 12: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.15.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.15.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 187. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16. Exposure scenario 16: Use at industrial site - Use in cleaning agents

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Sector of use:
SU 4, Manufacture of food products
SU 20, Health services
SU 0, Other

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 8, PC 35); various sectors (SU 4, SU 20, SU 0: other: NACE Code C10: manufacture of food products); ERC 6b

Explanation on the approach taken for the ES

The use of phosphoric acid as a cleaning agent includes cleaning agent for equipment and facilities in food and agro-food industry and other industries where industrial spraying, transfer of substance, roller application and brushing operations are considered. Typically in a cleaning scenario phosphoric acid is diluted (commonly 5-15% solutions of phosphoric acid), however for the purpose of a complete risk assessment a wide range of concentrations are assessed.

9.16.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.16.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.16.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 188. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.16.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 189. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.16.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 190. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.16.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 191. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.16.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 192. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.16.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 193. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.16.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.16.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 194. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.16.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 195. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.10. Worker contributing scenario 9: Transfer from/pouring from containers

(PROC 9)

9.16.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 196. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.11. Worker contributing scenario 10: Roller application or brushing of adhesive and other coating (PROC 10)

9.16.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 197. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.12. Worker contributing scenario 11: Treatment of articles by dipping and pouring (PROC 13)

9.16.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 198. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.16.13. Worker contributing scenario 12: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.16.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.16.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 199. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17. Exposure scenario 17: Use at industrial site - Use in cleaning agents

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Sector of use:
SU 4, Manufacture of food products
SU 20, Health services
SU 0, Other

Environment contributing scenario(s):	
Industrial use of substances in closed systems	ERC 7
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 8, PC 35); various sectors (SU 4, SU 20, SU 0: other: NACE Code C10: manufacture of food products); ERC 7

Explanation on the approach taken for the ES

The use of phosphoric acid as a cleaning agent includes cleaning agent for equipment and facilities in food and agro-food industry and other industries where industrial spraying, transfer of substance, roller application and brushing operations are considered. Typically in a cleaning scenario phosphoric acid is diluted (commonly 5-15% solutions of phosphoric acid), however for the purpose of a complete risk assessment a wide range of concentrations are assessed.

9.17.1. Environmental contributing scenario 1: Industrial use of substances in closed systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.17.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.17.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 200. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.17.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 201. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.17.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 202. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.17.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 203. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.17.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 204. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.17.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 205. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be

used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.17.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.17.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 206. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.17.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 207. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.17.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 208. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.11. Worker contributing scenario 10: Roller application or brushing of adhesive and other coating (PROC 10)

9.17.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 209. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.12. Worker contributing scenario 11: Treatment of articles by dipping and pouring (PROC 13)

9.17.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 210. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.006 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.006 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.012 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.006 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.17.13. Worker contributing scenario 12: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.17.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.17.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 211. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18. Exposure scenario 18: Use by professional worker - Detergent and cleaning agent

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Sector of use:
SU 20, Health services

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 8, PC 31, PC 35, PC 37, PC 0, other: UCN code A20100 antiscaling agents); ERC 8a, ERC 8d

9.18.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.18.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.18.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 212. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.06 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an

all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.3. Worker contributing scenario 2: Transfer from/pouring from containers (PROC 8a)

9.18.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 213. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8b)

9.18.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 214. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 9)

9.18.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 215. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.6. Worker contributing scenario 5: Roller application or brushing of adhesive and other coating (PROC 10)

9.18.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 216. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.7. Worker contributing scenario 6: Spraying outside industrial settings and/or applications (PROC 11)

9.18.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 217. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.18.8. Worker contributing scenario 7: Treatment of articles by dipping and pouring

(PROC 13)

9.18.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 218. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.18.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.18.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.18.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 219. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19. Exposure scenario 19: Use by professional worker - Detergent and cleaning agent

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Sector of use:
SU 20, Health services

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 8, PC 31, PC 35, PC 37, PC 0, other: UCN code A20100 antiscaling agents); ERC 8b, ERC 8e

9.19.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.19.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.19.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 220. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.06 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.06 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an

all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.3. Worker contributing scenario 2: Transfer from/pouring from containers (PROC 8a)

9.19.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 221. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8b)

9.19.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 222. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 9)

9.19.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 223. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.6. Worker contributing scenario 5: Roller application or brushing of adhesive and other coating (PROC 10)

9.19.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 224. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.7. Worker contributing scenario 6: Spraying outside industrial settings and/or applications (PROC 11)

9.19.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 225. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.19.8. Worker contributing scenario 7: Treatment of articles by dipping and pouring

(PROC 13)

9.19.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 226. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.19.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.19.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 5-25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.19.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 227. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.20. Exposure scenario 20: Consumer Use - Polishes and wax blends

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Consumer contributing scenario(s):	
Polishes and wax blends	PC 31

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use; polishes and wax blends (PC 31); ERC 8a, ERC 8d

Explanation on the approach taken for the ES

9.20.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.20.2. Consumer contributing scenario 1: Polishes and wax blends (PC 31)

9.20.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.1 g/g	External Tool (AISE REACT)
• Spray: Yes *Worst-case as per the tool used*	External Tool (AISE REACT)
• Oral contact foreseen: No	External Tool (AISE REACT)
• Product/Article subcategory: Polishes, spray (furniture, shoes)	External Tool (AISE REACT)
Amount used, frequency and duration of use/exposure	
• Amount of product used per application: = 30 g/event *Typical amount used*	External Tool (AISE REACT)
• Exposure time: = 0.33 hr *Typical value*	External Tool (AISE REACT)
• Frequency of use over a day: = 1 events/day *Typical = 1 per week*	External Tool (AISE REACT)
• Frequency of use over a year: Frequent	External Tool (AISE REACT)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	External Tool (AISE REACT)
Other conditions affecting consumers exposure	
• Inhalation factor: = 1	External Tool (AISE REACT)

9.20.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 228. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.16 mg/m³** (External Tool (AISE REACT))	RCR = 0.035
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.16 mg/m³** (External Tool (AISE REACT))	RCR = 0.444
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (External Tool (AISE REACT))	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.035

Conclusion on risk characterisation

Phosphoric acid is used in formulations which may be available to general public as various cleaning products, including polishes and waxes. In general terms the concentration of phosphoric acid in these products are very low and does not exceed 10%, with the exception of lime scale removers which may contain up to 15% phosphoric acid.

Furthermore the amounts of phosphoric acid used in these mixtures will interact with other ingredients in acid-base reactions and thus only residues of phosphoric acid will remain as such in the final product.

• It is required that household chemicals, containing phosphoric acid at ≥10% should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

Risks to consumers are adequately controlled by using the product according to the label instructions.

9.21. Exposure scenario 21: Consumer Use - Consumer use of washing and cleaning products

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Consumer contributing scenario(s):	
Washing and cleaning products	PC 35

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use; washing and cleaning products (including solvent based products) (PC 35); ERC 8a, ERC 8d

9.21.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.21.2. Consumer contributing scenario 1: Washing and cleaning products (PC 35)

9.21.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.1 g/g	External Tool (Consexpo 4.1)
• Oral contact foreseen: No	External Tool (Consexpo 4.1)
• Exposure via Inhalation route: Yes	External Tool (Consexpo 4.1)
• Spray: Yes	External Tool (Consexpo 4.1)
• Product/Article subcategory: Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	External Tool (Consexpo 4.1)
Amount used, frequency and duration of use/exposure	
• Amount of product used per application: = 16.2 g/event *As per default value contained in Consexpo 4.1*	External Tool (Consexpo 4.1)
• Exposure time: = 1 hr *Default value*	External Tool (Consexpo 4.1)
• Frequency of use over a day: = 1 events/day *Default*	External Tool (Consexpo 4.1)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	External Tool (Consexpo 4.1)
• Place of use: Indoor	External Tool (Consexpo 4.1)
Other conditions affecting consumers exposure	

	Method
• Inhalation factor: = 1	External Tool (Consexpo 4.1)

9.21.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 229. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (Consexpo 4.1))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (Consexpo 4.1))	RCR = 0.029
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (External Tool (Consexpo 4.1))	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (Consexpo 4.1)

- Inhalation, systemic, long-term:
  Inhalation mean concentration on day of exposure.

- Inhalation, local, long-term:
  Inhalation mean concentration on day of exposure.

Conclusion on risk characterisation

Phosphoric acid is used in formulations which may be available to general public as various cleaning products, including polishes and waxes. In general terms the concentration of phosphoric acid in these products are very low and does not exceed 10%, with the exception of lime scale removers which may contain up to 15% phosphoric acid.
Furthermore the amounts of phosphoric acid used in these mixtures will interact with other ingredients in acid-base reactions and thus only residues of phosphoric acid will remain as such in the final product.

• It is required that household chemicals, containing phosphoric acid at ≥10% should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

Risks to consumers are adequately controlled by using the product according to the label instructions.

9.22. Exposure scenario 22: Consumer Use - Consumer use of washing and cleaning products

Market sector: Cleaning agents (PC 0:Other: UCN code A20100 Antiscaling agents)
PC 8: Biocidal Products (e.g. Disinfectants, pest control); PC 31: Polishes and Wax Blends; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 0: Other

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Consumer contributing scenario(s):	
Washing and cleaning products	PC 35

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use; washing and cleaning products (including solvent based products) (PC 35); ERC 8b, ERC 8e

9.22.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.22.2. Consumer contributing scenario 1: Washing and cleaning products (PC 35)

9.22.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.15 g/g	External Tool (Consexpo 4.1)
• Exposure via Inhalation route: Yes	External Tool (Consexpo 4.1)
• Exposure via Oral route: Oral exposure is considered to be not relevant	External Tool (Consexpo 4.1)
• Product/Article subcategory: Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners) *Toilet cleaners*	External Tool (Consexpo 4.1)
• Spray: No	External Tool (Consexpo 4.1)
Amount used, frequency and duration of use/exposure	
• Amount of product used per application: = 110 g/event *Default*	External Tool (Consexpo 4.1)
• Exposure time: = 0.33 hr	External Tool (Consexpo 4.1)
• Frequency of use over a day: = 1 events/day *Default value for scenario. RIVM Report No. 320104003 notes that toilet cleaning operations may occur around 4 times per year*	External Tool (Consexpo 4.1)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	External Tool (Consexpo 4.1)
• Place of use: Indoor	External Tool (Consexpo 4.1)

9.22.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 230. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.069 mg/m³** (External Tool (Consexpo 4.1))	RCR = 0.015
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.069 mg/m³** (External Tool (Consexpo 4.1))	RCR = 0.191
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (External Tool (Consexpo 4.1))	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.015

Remarks on exposure data

External Tool (Consexpo 4.1)

- Inhalation, systemic, long-term:
  Inhalation mean concentration on day of exposure

- Inhalation, local, long-term:
  Inhalation mean concentration on day of exposure

Conclusion on risk characterisation

Phosphoric acid is used in formulations which may be available to general public as various cleaning products, including polishes and waxes. In general terms the concentration of phosphoric acid in these products are very low and does not exceed 10%, with the exception of lime scale removers which may contain up to 15% phosphoric acid.
Furthermore the amounts of phosphoric acid used in these mixtures will interact with other ingredients in acid-base reactions and thus only residues of phosphoric acid will remain as such in the final product.

• It is required that household chemicals, containing phosphoric acid at ≥10% should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

Risks to consumers are adequately controlled by using the product according to the label instructions.

9.23. Exposure scenario 23: Use at industrial site - Processing aid in chemical industry and other industries

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 4, Manufacture of food products
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals
SU 11, Manufacture of rubber products
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

Includes laboratory applications

ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 4

Explanation on the approach taken for the ES

This scenario covers all industrial activities in the chemical industry where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Phosphoric acid is assessed as an aqueous solution (>25%).

9.23.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.23.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 1)

9.23.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 231. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.23.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 232. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.23.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 233. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic,		RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
long-term		

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.23.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
Aqueous solutions of phosphoric acid	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 234. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.23.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 235. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.23.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 236. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.23.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.23.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 237. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.23.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 238. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.23.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 239. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.23.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 240. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.12. Worker contributing scenario 11: Use as laboratory reagent (PROC 15)

9.23.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.23.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 241. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.23.13. Worker contributing scenario 12: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.23.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.23.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 242. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves

Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.23.14. Worker contributing scenario 13: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.23.14.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.23.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 243. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.24. Exposure scenario 24: Use at industrial site - Processing aid in chemical industry and other industries

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 4, Manufacture of food products
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals
SU 11, Manufacture of rubber products
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

Includes laboratory applications

ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities in the chemical industry where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Phosphoric acid is assessed as an aqueous solution (>25%).

9.24.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.24.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 1)

9.24.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 244. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.24.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 245. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.24.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 246. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		>>>**CAUTION:** Risk <u>not</u> controlled (based on qualitative risk characterisation) <<<

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.24.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 247. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask,

containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.24.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 248. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.24.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 249. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.24.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.24.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 250. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.24.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 251. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.24.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 252. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.24.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 253. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.12. Worker contributing scenario 11: Use as laboratory reagent (PROC 15)

9.24.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.24.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 254. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.24.13. Worker contributing scenario 12: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.24.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.24.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 255. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.24.14. Worker contributing scenario 13: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.24.14.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.24.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 256. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.25. Exposure scenario 25: Use at industrial site - Processing aid in chemical industry and other industries, resulting in incorporation in articles

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 4, Manufacture of food products
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals
SU 11, Manufacture of rubber products
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers	ERC 6d
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

Includes laboratory applications

ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 6d

Explanation on the approach taken for the ES

This scenario covers all industrial activities in the chemical industry where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Phosphoric acid is assessed as an aqueous solution (>25%).

9.25.1. Environmental contributing scenario 1: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.25.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 1)

9.25.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 257. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.25.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 258. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.25.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 259. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.25.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 260. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.25.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 261. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.25.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 262. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.25.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.25.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 263. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC

8b)

9.25.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 264. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.25.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 265. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring

(PROC 13)

9.25.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 266. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.12. Worker contributing scenario 11: Use as laboratory reagent (PROC 15)

9.25.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.25.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 267. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.25.13. Worker contributing scenario 12: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.25.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.25.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 268. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.25.14. Worker contributing scenario 13: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.25.14.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.25.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 269. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.26. Exposure scenario 26: Use at industrial site - Processing aid in chemical industry and other industries

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 4, Manufacture of food products
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals
SU 11, Manufacture of rubber products
SU 16, Manufacture of computer, electronic and optical products, electrical equipment
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use of substances in closed systems	ERC 7
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

Includes laboratory applications
ES Short Title for ES communication: Use at industrial sites; various products; various sectors; ERC 7

Explanation on the approach taken for the ES

This scenario covers all industrial activities in the chemical industry where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Phosphoric acid is assessed as an aqueous solution (>25%).

9.26.1. Environmental contributing scenario 1: Industrial use of substances in closed systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.26.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 1)

9.26.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 270. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.26.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 271. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.26.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 272. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic,		RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
long-term		

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.26.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
Aqueous solutions of phosphoric acid	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 273. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.26.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 274. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.7. Worker contributing scenario 6: Spraying in industrial settings and applications (PROC 7)

9.26.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95% Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 275. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.26.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.26.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 276. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.26.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 277. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.26.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 278. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.11. Worker contributing scenario 10: Treatment of articles by dipping and pouring (PROC 13)

9.26.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 279. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.12. Worker contributing scenario 11: Use as laboratory reagent (PROC 15)

9.26.12.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.26.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 280. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.1 mg/m³ (TRA Workers 3.0) 0.2 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE)) **Additional data not used for RCR:** 0.4 mg/m³ (TRA Workers 3.0) 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, long-term:
  Calculated as a 'liquid' in MEASE
- Inhalation, local, acute:
  Calculated as a 'liquid' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: >25%
- Containment: Semi-closed process with occasional controlled exposure
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: yes [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Advanced
- Place of use: Indoor

- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.26.13. Worker contributing scenario 12: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.26.13.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with	

	Method
basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.26.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 281. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.26.14. Worker contributing scenario 13: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.26.14.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.26.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 282. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be

consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.27. Exposure scenario 27: Use at industrial site - Use of phosphoric acid as a catalyst

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; intermediate (PC 19); various sectors (SU 8, SU 9); ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities in the chemical industry where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Phosphoric acid is assessed as an aqueous solution (>25%).

9.27.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.27.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.27.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 283. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in

accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.27.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 284. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.27.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 285. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.27.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 286. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8a)

9.27.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 287. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 8b)

9.27.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 288. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.27.8. Worker contributing scenario 7: Use as laboratory reagent (PROC 15)

9.27.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.27.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 289. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.28. Exposure scenario 28: Use by professional worker - Laboratory use

Market sector: Chemical industry (Use of phosphoric acid as a processing aid)
PC 1: Adhesives, Sealants; PC 9a: Coatings and Paints, Thinners, paint removers; PC 9b: Fillers, putties, plasters, modelling clay; PC 13: Fuels; PC 19: Intermediate; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 21: Laboratory Chemicals; PC 23: Leather tanning, dye, finishing, impregnation and care products; PC 24: Lubricants, Greases, Release Products; PC 25: Metal Working Fluids; PC 26: Paper and board dye, finishing and impregnation products: including bleaches and other processing aids;; PC 32: Polymer Preparations and Compounds; PC 33: Semiconductors; PC 34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids;; PC 35: Washing and Cleaning Products (including solvent based products); PC 37: Water treatment chemicals; PC 39: Cosmetics, personal care products

Sector of use:
SU 24, Scientific research and development

Environment contributing scenario(s):	
Wide dispersive indoor use of reactive substances in open systems	ERC 8b
Worker contributing scenario(s):	
Use as laboratory reagent	PROC 15

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; Laboratory chemicals (PC 21); ERC 8b

Explanation on the approach taken for the ES

Phosphoric acid is assessed as an aqueous solution (>25%).

9.28.1. Environmental contributing scenario 1: Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.28.2. Worker contributing scenario 1: Use as laboratory reagent (PROC 15)

9.28.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	

	Method
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.28.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 290. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.29. Exposure scenario 29: Use at industrial site - Use as a phosphate source

Market sector: Phosphate Source (Phosphoric acid is used as a source of phosphate in various industries.)
PC 0: Other

Sector of use:
SU 4, Manufacture of food products
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9

Description of the activities and technical processes covered in the exposure scenario:

Phosphate source for feeding yeasts in food industry and as a bacterial feed in sewage treatment.

ES Short Title for ES communication: Use at industrial sites; other product – nutritional source (PC 0); various sectors (SU 4, SU 23); ERC 4

Explanation on the approach taken for the ES

Phosphoric acid is assessed as an aqueous solution (>25% w/w).

9.29.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.29.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 3)

9.29.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
Aqueous solutions of phosphoric acid	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.29.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 291. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.29.3. Worker contributing scenario 2: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.29.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.29.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 292. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.29.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8a)

9.29.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
Aqueous solutions of phosphoric acid	
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.29.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 293. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and

professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.29.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 8b)

9.29.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.29.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 294. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.29.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 9)

9.29.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.29.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 295. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.30. Exposure scenario 30: Use at industrial site - Use as a phosphate source

Market sector: Phosphate Source (Phosphoric acid is used as a source of phosphate in various industries.)
PC 0: Other

Sector of use:
SU 4, Manufacture of food products
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Use as a phosphate source	ERC 6b
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9

Description of the activities and technical processes covered in the exposure scenario:

Phosphate source for feeding yeasts in food industry and as a bacterial feed in sewage treatment.

ES Short Title for ES communication: Use at industrial sites; other product – nutritional source (PC 0); various sectors (SU 4, SU 23); ERC 6b

Explanation on the approach taken for the ES

Phosphoric acid is assessed as an aqueous solution (>25% w/w).

9.30.1. Environmental contributing scenario 1: Use as a phosphate source

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.30.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 3)

9.30.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.30.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 296. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask,

containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.30.3. Worker contributing scenario 2: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.30.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.30.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 297. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.30.4. Worker contributing scenario 3: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

9.30.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.30.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 298. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.30.5. Worker contributing scenario 4: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

9.30.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.30.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 299. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.30.6. Worker contributing scenario 5: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

9.30.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.30.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 300. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.31. Exposure scenario 31: Use at industrial site - Use as a binding agent in ceramic materials and refractory products, resulting in incorporation in articles.

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Sector of use:
SU 13, Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use resulting in inclusion into or onto a matrix	ERC 5
Worker contributing scenario(s):	
Spraying in industrial settings and applications	PROC 7
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900); various sectors (SU 13, SU 19); ERC 5

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the building and construction applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.31.1. Environmental contributing scenario 1: Industrial use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.31.2. Worker contributing scenario 1: Spraying in industrial settings and applications (PROC 7)

9.31.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.31.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 301. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.31.3. Worker contributing scenario 2: Roller application or brushing of adhesive and other coating (PROC 10)

9.31.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.31.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 302. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.31.4. Worker contributing scenario 3: Treatment of articles by dipping and pouring (PROC 13)

9.31.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.31.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 303. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.31.5. Worker contributing scenario 4: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.31.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.31.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 304. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.31.6. Worker contributing scenario 5: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.31.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.31.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 305. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.31.7. Worker contributing scenario 6: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.31.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5% *Phosphoric acid contained in solid products.*	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.31.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 306. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.32. Exposure scenario 32: Use at industrial site - Use as a binding agent in ceramic materials and refractory products, resulting in incorporation in articles.

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Sector of use:
SU 13, Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU 19, Building and construction work

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Spraying in industrial settings and applications	PROC 7
Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900; various sectors (SU 13, SU 19); ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the building and construction applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.32.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.32.2. Worker contributing scenario 1: Spraying in industrial settings and applications (PROC 7)

9.32.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.32.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 307. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask,

containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.32.3. Worker contributing scenario 2: Roller application or brushing of adhesive and other coating (PROC 10)

9.32.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.32.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 308. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.32.4. Worker contributing scenario 3: Treatment of articles by dipping and pouring (PROC 13)

9.32.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%] *Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply. As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids. Due to the corrosive properties appropriate skin and eye protection is mandatory. Hand protection: impervious chemical resistant protective gloves: - material: chloroprene, neoprene, PVC gloves Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent. If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.*	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.32.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 309. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.32.5. Worker contributing scenario 4: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.32.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.32.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 310. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.32.6. Worker contributing scenario 5: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.32.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.32.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 311. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.32.7. Worker contributing scenario 6: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.32.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5% *Phosphoric acid contained in solid products.*	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.32.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 312. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.33. Exposure scenario 33: Use by professional worker - Construction Applications

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Sector of use:
SU 19, Building and construction work

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Hand-mixing with intimate contact and only PPE available	PROC 19
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 9b, PC 15, PC 20); building and construction work (SU 19)

Explanation on the approach taken for the ES

This scenario covers all professional activities related to the building and construction applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.33.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.33.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.33.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.33.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 313. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.33.3. Worker contributing scenario 2: Roller application or brushing of adhesive and other coating (PROC 10)

9.33.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.33.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 314. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.33.4. Worker contributing scenario 3: Spraying outside industrial settings and/or applications (PROC 11)

9.33.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 4 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.33.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 315. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in

accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.33.5. Worker contributing scenario 4: Treatment of articles by dipping and pouring (PROC 13)

9.33.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.33.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 316. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.33.6. Worker contributing scenario 5: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.33.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.33.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 317. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.33.7. Worker contributing scenario 6: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.33.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: >25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.33.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 318. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.15 mg/m³** (TRA Workers 3.0)	RCR = 0.014
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.15 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.15 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.014

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.33.8. Worker contributing scenario 7: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.33.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.33.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 319. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.15 mg/m³** (TRA Workers 3.0)	RCR = 0.014
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.15 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.15 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.014

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.34. Exposure scenario 34: Use by professional worker - Use as a binding agent in ceramic materials and in refractory products

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Sector of use:
SU 13, Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU 19, Building and construction work

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Roller application or brushing of adhesive and other coating	PROC 10
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 20, PC 0: other: UCN-Code B 20300, K 35900); various sectors (SU 13, SU 19); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

This scenario covers all professional activities related to the building and construction applications where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.34.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.34.2. Worker contributing scenario 1: Roller application or brushing of adhesive and other coating (PROC 10)

9.34.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.34.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 320. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The

formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.34.3. Worker contributing scenario 2: Spraying outside industrial settings and/or applications (PROC 11)

9.34.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 4 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.34.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 321. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.34.4. Worker contributing scenario 3: Treatment of articles by dipping and pouring (PROC 13)

9.34.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.34.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 322. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.34.5. Worker contributing scenario 4: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.34.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.34.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 323. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation**
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.34.6. Worker contributing scenario 5: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.34.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)

	Method
Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.34.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 324. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:

Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.35. Exposure scenario 35: Consumer Use - Consumer use as a binding agent in ceramic materials and in refractory products

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Consumer contributing scenario(s):	
Consumer use of products containing phosphoric acid	PC 20

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use: various products (PC 20, PC 0: Other: UCN-Code B 20300, K 35900); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

This scenario covers consumer formulations used in construction and building applications where phosphoric acid is present in concentrations < 10%.

9.35.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.35.2. Consumer contributing scenario 1: Consumer use of products containing phosphoric acid (PC 20)

9.35.2.1. Conditions of use

Description of product/article/activity covered:Use of phosphoric acid as a binding material

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.1 g/g *Maximum concentration of phosphoric acid in consumer products*	TRA Consumers 3.1
• Exposure via Oral route: Oral exposure is considered to be not relevant	TRA Consumers 3.1
• Exposure via Inhalation route: Yes	TRA Consumers 3.1
• Spray: No	TRA Consumers 3.1
Amount used, frequency and duration of use/exposure	
• Frequency of use over a year: Infrequent	TRA Consumers 3.1
• Amount of product used per application: = 50 g/event	TRA Consumers 3.1
• Exposure time: = 4 hr	TRA Consumers 3.1
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	TRA Consumers 3.1
• Place of use: Indoor	TRA Consumers 3.1
Other conditions affecting consumers exposure	
• Inhalation factor: = 1	TRA Consumers 3.1

9.35.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 325. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.294 mg/m³** (TRA Consumers 3.1)	RCR = 0.064
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.294 mg/m³** (TRA Consumers 3.1)	RCR = 0.817
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (TRA Consumers 3.1)	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.064

Conclusion on risk characterisation

Protective equipment measures: product related design measures are required. These include specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.
For consumer products containing phosphoric acid (concentration <10%) it is recommended to wear hand protection, long sleeves to prevent splashes and eye protection.

Risks to consumers are adequately controlled by using the product according to the label instructions.

9.36. Exposure scenario 36: Service life (professional worker) - Service life of construction articles containing phosphoric acid

Market sector: Building and Construction
PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 0: Other

Sector of use:
SU 13, Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU 19, Building and construction work

Article categories:
AC 4, Stone, plaster, cement, glass and ceramic articles (Articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)

Environment contributing scenario(s):	
Wide dispersive indoor use of long-life articles and materials with low release; Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)	ERC 10a, ERC 11a
Worker contributing scenario(s):	
Low energy manipulation of substances bound in materials and/or articles	PROC 21
Open processing and transfer operations (with minerals) at elevated temperature	PROC 23

Description of the activities and technical processes covered in the exposure scenario:

Also covers industrial processing and consumer exposure.

ES Short Title for ES communication: Service life (worker), stone, plaster, cement, glass and ceramic articles (AC 4); ERC 10a, ERC 11a

Explanation on the approach taken for the ES

This scenario covers the service life of solid articles containing < 5% phosphoric acid.

9.36.1. Environmental contributing scenario 1: Wide dispersive indoor use of long-life articles and materials with low release; Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.36.2. Worker contributing scenario 1: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.36.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.36.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 326. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implement (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. Personal protective equipment is required.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.36.3. Worker contributing scenario 2: Open processing and transfer operations (with minerals) at elevated temperature (PROC 23)

9.36.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.36.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 327. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implement (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. Personal protective equipment is required.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.37. Exposure scenario 37: Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 12, Manufacture of plastics products, including compounding and conversion

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 4

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.37.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.37.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.37.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 328. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.37.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 329. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.37.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 330. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.37.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 331. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.37.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 332. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.37.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.37.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 333. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.37.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 334. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.37.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 335. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.37.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 336. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.37.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.37.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.37.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 337. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38. Exposure scenario 38: Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 12, Manufacture of plastics products, including compounding and conversion

Environment contributing scenario(s):	
Industrial use resulting in inclusion into or onto a matrix	ERC 5
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles.

ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 5

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.38.1. Environmental contributing scenario 1: Industrial use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.38.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.38.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 338. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.38.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 339. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.38.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 340. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.38.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 341. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.38.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 342. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.38.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.38.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 343. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.38.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 344. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.38.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 345. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.38.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 346. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.38.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.38.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.38.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 347. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39. Exposure scenario 39: Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 12, Manufacture of plastics products, including compounding and conversion

Environment contributing scenario(s):	
Industrial use of reactive processing aids	ERC 6b
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.39.1. Environmental contributing scenario 1: Industrial use of reactive processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.39.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.39.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 348. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.39.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 349. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.39.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 350. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.39.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 351. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.39.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 352. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask,

containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.39.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.39.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 353. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.39.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 354. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.39.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 355. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.39.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 356. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.39.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.39.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)

	Method
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.39.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 357. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40. Exposure scenario 40: Use at industrial site - Use as an additive, pigment or auxiliary in plastics, resins and paints

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 12, Manufacture of plastics products, including compounding and conversion

Environment contributing scenario(s):	
Industrial use of substances in closed systems	ERC 7
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 9a, PC 20, PC 32); manufacture of plastics products, including compounding and conversion (SU 12); ERC 7

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.40.1. Environmental contributing scenario 1: Industrial use of substances in closed systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.40.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.40.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 358. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.40.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 359. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.4. Worker contributing scenario 3: Use in closed batch process (synthesis or formulation) (PROC 3)

9.40.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 360. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.40.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 361. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.6. Worker contributing scenario 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.40.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 362. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask,

containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.40.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.40.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 363. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.40.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 364. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.40.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 365. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.40.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 366. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.40.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.40.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.40.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 367. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical

safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41. Exposure scenario 41: Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 6a, Manufacture of wood and wood products (Su 0: Other: Fire service activities (NACE 84.25))
SU 12, Manufacture of plastics products, including compounding and conversion (Su 0: Other: Fire service activities (NACE 84.25))
SU 0, Other (Su 0: Other: Fire service activities (NACE 84.25))

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8a, ERC 8d

Explanation on the approach taken for the ES

This scenario covers all professional activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.41.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.41.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.41.2.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 368. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.41.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 369. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.4. Worker contributing scenario 3: Use in closed batch process (synthesis or

formulation) (PROC 3)

9.41.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 370. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.41.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 371. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.6. Worker contributing scenario 5: Mixing or blending in batch processes for

formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.41.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 372. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.41.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: >25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.41.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 373. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.

9.41.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.41.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 374. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.41.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 375. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.41.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 376. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.41.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.41.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.41.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 377. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42. Exposure scenario 42: Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 6a, Manufacture of wood and wood products (SU 0: Other: Fire service activities (NACE 84.25))
SU 12, Manufacture of plastics products, including compounding and conversion (SU 0: Other: Fire service activities (NACE 84.25))
SU 0, Other (SU 0: Other: Fire service activities (NACE 84.25))

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

This scenario covers all professional activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.42.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.42.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.42.2.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 378. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.42.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 379. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.4. Worker contributing scenario 3: Use in closed batch process (synthesis or

formulation) (PROC 3)

9.42.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 380. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.42.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 381. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.6. Worker contributing scenario 5: Mixing or blending in batch processes for

formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.42.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 382. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.42.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: >25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.42.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 383. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.

9.42.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.42.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 384. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.42.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 385. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.42.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 386. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.42.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.42.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.42.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 387. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43. Exposure scenario 43: Use by professional worker - Use as an additive, pigment or auxiliary in plastics, resins and paints, resulting in incorporation in articles

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 6a, Manufacture of wood and wood products (SU 0: Other: Fire service activities (NACE 84.25))
SU 12, Manufacture of plastics products, including compounding and conversion (SU 0: Other: Fire service activities (NACE 84.25))
SU 0, Other (SU 0: Other: Fire service activities (NACE 84.25))

Environment contributing scenario(s):	
Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix	ERC 8f, ERC 8c
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 9a, PC 20, PC 32, PC 0: other: flame retardant agent); various sectors (SU 6a, SU 12, SU 0: other: fire service activities (NACE 84.25); ERC 8c, ERC 8f

Explanation on the approach taken for the ES

This scenario covers all professional activities related to the use of phosphoric acid as an additive, pigment or auxiliary in plastics resins and paints. Phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying and rolling applications, etc. Handling at elevated temperature is also considered. Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.43.1. Environmental contributing scenario 1: Wide dispersive outdoor use resulting in inclusion into or onto a matrix; Wide dispersive indoor use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.43.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.43.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 388. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.43.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 389. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.4. Worker contributing scenario 3: Use in closed batch process (synthesis or

formulation) (PROC 3)

9.43.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 390. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.5. Worker contributing scenario 4: Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

9.43.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 391. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.6. Worker contributing scenario 5: Mixing or blending in batch processes for

formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.43.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 392. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.7. Worker contributing scenario 6: Calendering operations (PROC 6)

9.43.7.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: >25%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.43.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 393. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.

9.43.8. Worker contributing scenario 7: Transfer from/pouring from containers (PROC 8a)

9.43.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)

	Method
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 394. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.9. Worker contributing scenario 8: Transfer from/pouring from containers (PROC 8b)

9.43.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 395. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.10. Worker contributing scenario 9: Transfer from/pouring from containers (PROC 9)

9.43.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 396. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.43.11. Worker contributing scenario 10: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.43.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.43.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 397. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.44. Exposure scenario 44: Service life (professional worker) - Service life of plastic articles and resins containing low levels of phosphoric acid (professional workers)

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Sector of use:
SU 12, Manufacture of plastics products, including compounding and conversion

Article categories:
AC 13, Plastic articles

Environment contributing scenario(s):	
Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)	ERC 11a
Worker contributing scenario(s):	
Worker service life contributing scenario [edit]	PROC 21

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Service life (worker and consumer), plastic articles (AC 13); ERC 11a

Explanation on the approach taken for the ES

This scenario covers solid objects where phosphoric acid is present in concentrations ≤ 5% as a worst-case.

9.44.1. Environmental contributing scenario 1: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.44.2. Worker contributing scenario 1: Worker service life contributing scenario [edit] (PROC 21)

9.44.2.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: 1-5%	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.44.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 398. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.03 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.03 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.03 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.12 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.06 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.45. Exposure scenario 45: Service life (consumers) - Service life of plastic articles and resins containing low levels of phosphoric acid (consumer use)

Market sector: Plastics, resins and paints
PC 9a: Coatings and Paints, Thinners, paint removers; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 32: Polymer Preparations and Compounds; PC 0: Other

Environment contributing scenario(s):	
Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)	ERC 11a
Consumer contributing scenario(s):	
Plastic Articles	AC 13

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Service life (worker and consumer), plastic articles (AC 13); ERC 11a

Explanation on the approach taken for the ES

This scenario covers solid objects where phosphoric acid is present in concentrations ≤ 5% as a worst-case.

9.45.1. Environmental contributing scenario 1: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.45.2. Consumer contributing scenario 1: Plastic Articles (AC 13)

9.45.2.1. Conditions of use

Description of product/article/activity covered:Plastic articles containing very low levels of phosphoric acid.

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.05 g/g	TRA Consumers 3.1
• Exposure via Dermal route: Yes	TRA Consumers 3.1
• Exposure via Oral route: Yes	TRA Consumers 3.1
• Exposure via Inhalation route: Inhalation exposure is considered to be not relevant	TRA Consumers 3.1
Amount used, frequency and duration of use/exposure	
• Frequency of use over a year: Frequent	TRA Consumers 3.1
• Frequency of use over a day: = 1 events/day	TRA Consumers 3.1
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	TRA Consumers 3.1
Other conditions affecting consumers exposure	
• Body parts potentially exposed: Fingertips	TRA Consumers 3.1
• Dermal transfer factor: = 1	TRA Consumers 3.1
• Oral transfer factor: = 1	TRA Consumers 3.1
• Volume swallowed: = 0.1 cm3 *Calculated from the default values in accordance with Chapter R.15: Consumer Exposure Estimation, chapter R.15.4.*	TRA Consumers 3.1

9.45.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 399. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0 mg/m³** (TRA Consumers 3.1)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0 mg/m³** (TRA Consumers 3.1)	RCR < 0.01
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**0.298 mg/kg bw/day** (TRA Consumers 3.1)	Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0.083 mg/kg bw/day** (TRA Consumers 3.1)	RCR = 0.833
Combined routes, systemic, long-term		RCR = 0.833

Conclusion on risk characterisation

Inhalation: Evaporation of the substance from solid matrices is not considered appropriate.

Dermal: Although the model assumes a transfer factor of 1 and 100% absorption, these values are not considered realistic since phosphoric acid is incorporated in the article matrix and is not released during handling operations.

Eye: Eye contact is not a relevant exposure pathway.

Consumer exposure to phosphoric acid in plastic articles is considered to be minimal. A worst-case assessment has been performed and shows that the risks are adequately controlled.

9.46. Exposure scenario 46: Use at industrial site - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Handling of solid inorganic substances at ambient temperature.	PROC 26

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 4

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.46.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.46.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.46.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 400. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.46.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 401. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.4. Worker contributing scenario 3: Calendering operations (PROC 6)

9.46.4.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0

	Method
Solid phosphoric acid >25%	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.46.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 402. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.

As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.5. Worker contributing scenario 4: Spraying in industrial settings and applications (PROC 7)

9.46.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 403. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		>>>**CAUTION:** Risk not controlled (based on qualitative risk characterisation) <<<
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.46.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8b)

9.46.6.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 404. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 9)

9.46.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 405. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.8. Worker contributing scenario 7: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.46.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 406. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.46.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 407. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.46.10. Worker contributing scenario 9: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.46.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Solid in solid mixtures: Yes	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.46.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 408. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.46.11. Worker contributing scenario 10: Handling of solid inorganic substances at ambient temperature. (PROC 26)

9.46.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 26 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.46.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 409. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.27 mg/m³** (External Tool (MEASE))	RCR = 0.025
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.27 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, local, acute	**0.54 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.025

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47. Exposure scenario 47: Use at industrial site - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Industrial use resulting in manufacture of another substance (use of intermediates)	ERC 6a
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Handling of solid inorganic substances at ambient temperature.	PROC 26

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 6b

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.47.1. Environmental contributing scenario 1: Industrial use resulting in manufacture of another substance (use of intermediates)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.47.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.47.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 410. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.47.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 411. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.4. Worker contributing scenario 3: Calendering operations (PROC 6)

9.47.4.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.47.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 412. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
As solid phosphoric acid is considered to be of low dustiness local exhaust ventilation (LEV) and personal respiratory equipment (PRE) are not required for the handling of solids.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.5. Worker contributing scenario 4: Spraying in industrial settings and applications (PROC 7)

9.47.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 413. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.47.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8b)

9.47.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 414. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 9)

9.47.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 415. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.8. Worker contributing scenario 7: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.47.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 416. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.47.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 417. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.47.10. Worker contributing scenario 9: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.47.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Solid in solid mixtures: Yes *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.47.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 418. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be

used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.47.11. Worker contributing scenario 10: Handling of solid inorganic substances at ambient temperature. (PROC 26)

9.47.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 26 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.47.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 419. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.27 mg/m³** (External Tool (MEASE))	RCR = 0.025
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.27 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.54 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR = 0.025

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE

- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE

- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48. Exposure scenario 48: Use at industrial site - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Industrial use of substances in closed systems	ERC 7
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Spraying in industrial settings and applications	PROC 7
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 14
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22
Handling of solid inorganic substances at ambient temperature.	PROC 26

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use at industrial sites; various products (PC 4, 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 7

Explanation on the approach taken for the ES

This scenario covers all industrial activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.48.1. Environmental contributing scenario 1: Industrial use of substances in closed systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.48.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.48.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 420. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.48.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 421. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.4. Worker contributing scenario 3: Calendering operations (PROC 6)

9.48.4.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	TRA Workers 3.0
• Containment: No	TRA Workers 3.0

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.48.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 422. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.5. Worker contributing scenario 4: Spraying in industrial settings and applications (PROC 7)

9.48.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 423. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.48.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 8b)

9.48.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 424. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.7. Worker contributing scenario 6: Transfer from/pouring from containers (PROC 9)

9.48.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 425. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.8. Worker contributing scenario 7: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 14)

9.48.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 426. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.48.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 427. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:

Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.48.10. Worker contributing scenario 9: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.48.10.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Solid in solid mixtures: Yes *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 90%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Elevated temperature < melting point	TRA Workers 3.0

9.48.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 428. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (TRA Workers 3.0)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.4 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.48.11. Worker contributing scenario 10: Handling of solid inorganic substances at ambient temperature. (PROC 26)

9.48.11.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 26 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.48.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 429. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.27 mg/m³** (External Tool (MEASE))	RCR = 0.025
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.27 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.54 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.27 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.025

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:

- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49. Exposure scenario 49: Use by professional worker - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Spraying outside industrial settings and/or applications	PROC 11
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 8a, ERC 8d

Explanation on the approach taken for the ES

This scenario covers all professional activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.49.1. Environmental contributing scenario 1: Wide dispersive outdoor use of processing aids in open systems; Wide dispersive indoor use of processing aids in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.49.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.49.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 430. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.3. Worker contributing scenario 2: Calendering operations (PROC 6)

9.49.3.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.49.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 431. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8a)

9.49.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with	

	Method
basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 432. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 8b)

9.49.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 433. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 9)

9.49.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 434. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.7. Worker contributing scenario 6: Spraying outside industrial settings and/or applications (PROC 11)

9.49.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 4 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 435. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.49.8. Worker contributing scenario 7: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.49.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)

	Method
Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 436. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.49.9. Worker contributing scenario 8: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.49.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 22 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.49.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 437. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.50. Exposure scenario 50: Use by professional worker - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Spraying outside industrial settings and/or applications	PROC 11
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

This scenario covers all professional activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.50.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.50.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.50.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	

	Method
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 438. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.50.3. Worker contributing scenario 2: Calendering operations (PROC 6)

9.50.3.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.50.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 439. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.

9.50.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8a)

9.50.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with	

	Method
basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 440. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.50.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 8b)

9.50.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 441. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.50.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 9)

9.50.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 442. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.50.7. Worker contributing scenario 6: Spraying outside industrial settings and/or applications (PROC 11)

9.50.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 4 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 443. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.50.8. Worker contributing scenario 7: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.50.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)

	Method
Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 444. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.50.9. Worker contributing scenario 8: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.50.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 22 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.50.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 445. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.51. Exposure scenario 51: Use by professional worker - Use in water and wastewater treatment

Market sector: Waste-water treatment
PC 16: Heat Transfer Fluids; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents; PC 36: Water softeners; PC 37: Water treatment chemicals

Sector of use:
SU 23, Electricity, steam, gas water supply and sewage treatment

Environment contributing scenario(s):	
Wide dispersive outdoor use of substances in closed systems; Wide dispersive indoor use of substances in closed systems	ERC 9b, ERC 9a
Worker contributing scenario(s):	
Use in closed, continuous process with occasional controlled exposure	PROC 2
Calendering operations	PROC 6
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Spraying outside industrial settings and/or applications	PROC 11
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations (with minerals) at elevated temperature	PROC 22

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; various products (PC 4, PC 16, PC 20, PC 36, PC 37); electricity, steam, gas water supply and sewage treatment (SU 23); ERC 9a, 9b

Explanation on the approach taken for the ES

This scenario covers all professional activities related to industrial water treatment operations where phosphoric acid is handled and where worker exposures may arise, for example, loading/unloading, diluting, sampling, mixing and blending, packaging and re-packaging, spraying calendaring tasks.
Typically phosphoric acid is provided to this use as an 85% aqueous solution and therefore aqueous solutions >25% are assessed.

9.51.1. Environmental contributing scenario 1: Wide dispersive outdoor use of substances in closed systems; Wide dispersive indoor use of substances in closed systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.51.2. Worker contributing scenario 1: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.51.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 446. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with

the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.51.3. Worker contributing scenario 2: Calendering operations (PROC 6)

9.51.3.1. Conditions of use

	Method
Product (article) characteristics	
• Dustiness of material: Low *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%. PROC 22 is only relevant for solids therefore the exposure is calculated for a solid, low dustiness.*	TRA Workers 3.0
• Concentration of substance in mixture: Substance as such *Solid phosphoric acid >25%*	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Solid phosphoric acid >25%*	TRA Workers 3.0
• Containment: No	TRA Workers 3.0
• Local exhaust ventilation: yes [Effectiveness Inhal: 80%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Solid phosphoric acid >25%*	TRA Workers 3.0
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Process temperature (for solid): Ambient	TRA Workers 3.0

9.51.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 447. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.2 mg/m³** (TRA Workers 3.0)	RCR = 0.019
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.2 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.2 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.8 mg/m³** (TRA Workers 3.0)	Exposure/DMEL = 0.4 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.019

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of LEV.

9.51.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8a)

9.51.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with	

	Method
basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 448. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.51.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 8b)

9.51.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 449. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.51.6. Worker contributing scenario 5: Transfer from/pouring from containers (PROC 9)

9.51.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 450. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.51.7. Worker contributing scenario 6: Spraying outside industrial settings and/or applications (PROC 11)

9.51.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 4 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 20) [Effectiveness Inhal: 95%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 451. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.6 mg/m³** (External Tool (MEASE))	RCR = 0.056
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.6 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6 Qualitative risk characterisation (see below)
Inhalation, local, acute	**1.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.6

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.056

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.51.8. Worker contributing scenario 7: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.51.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25%	External Tool (MEASE)

	Method
Phosphoric acid is typically provided to this use in the following aqueous solutions: 36%, 75%, 80%, 85%.	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 452. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.51.9. Worker contributing scenario 8: Potentially closed processing operations (with minerals) at elevated temperature (PROC 22)

9.51.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (35-85%). PROC 22 is only applicable for solids.*	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *82% efficiency*	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.51.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 453. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, long-term:
  Calculated as solid, low dustiness in MEASE
- Inhalation, local, acute:
  Calculated as solid, low dustiness in MEASE Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).

9.52. Exposure scenario 52: Use at industrial site - Use of lubricants in high energy open processes

Market sector: Lubricants and lubricant additives
PC 24: Lubricants, Greases, Release Products

Sector of use:
SU 17, General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment.

Environment contributing scenario(s):	
Industrial use of processing aids in processes and products, not becoming part of articles	ERC 4
Worker contributing scenario(s):	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Transfer from/pouring from containers	PROC 8b
Lubrication at high energy conditions and in partly open process	PROC 17

Description of the activities and technical processes covered in the exposure scenario:

In high speed machinery such as metal rolling / forming or metalworking fluids for machining and grinding, under closed and partly open conditions.

ES Short Title for ES communication: Use at industrial sites; lubricants, greases, release products (PC 24); general manufacturing, e.g. machinery, equipment, vehicles, other transport equipment (SU 17).

Explanation on the approach taken for the ES

This scenario covers the industrial use of phosphoric acid in lubricants. Worker exposures to liquid phosphoric acid may arise during transfer, sampling and high energy lubrication processes. Phosphoric acid is assessed as an aqueous solution (>25%).

9.52.1. Environmental contributing scenario 1: Industrial use of processing aids in processes and products, not becoming part of articles

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.52.2. Worker contributing scenario 1: Use in closed process, no likelihood of exposure (PROC 1)

9.52.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.52.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 454. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.52.3. Worker contributing scenario 2: Use in closed, continuous process with occasional controlled exposure (PROC 2)

9.52.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.52.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 455. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.001 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.001 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.002 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.001 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.52.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8b)

9.52.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)

	Method
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.52.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 456. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.

In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.52.5. Worker contributing scenario 4: Lubrication at high energy conditions and in partly open process (PROC 17)

9.52.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour) *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Occupational Health and Safety Management System: Advanced	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%] *Aqueous solutions of phosphoric acid*	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.52.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 457. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason, automated and closed systems are preferable for industrial and professional applications.
In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Due to the corrosive properties appropriate skin and eye protection is mandatory.
Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53. Exposure scenario 53: Use by professional worker - Use of fertilisers containing phosphoric acid

Market sector: Fertilisers
PC 12: Fertilizers

Sector of use:
SU 1, Agriculture, forestry, fishery

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer from/pouring from containers	PROC 8a
Transfer from/pouring from containers	PROC 8b
Transfer from/pouring from containers	PROC 9
Spraying outside industrial settings and/or applications	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Hand-mixing with intimate contact and only PPE available	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; fertilisers (PC 12)

Explanation on the approach taken for the ES

Phosphoric acid is used in liquid fertilisers in agricultural facilities and small farms, including transfer, loading, unloading, dilution operations, surface spreading or incorporation through pipes at open fields. Fertilisation of amenities (e.g. parks, public lawns, sport fields, golf courses)also occurs.
For the purpose of exposure assessment aqueous solutions are assessed.

9.53.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.53.2. Worker contributing scenario 1: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC 5)

9.53.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)

	Method
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 458. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement

for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.3. Worker contributing scenario 2: Transfer from/pouring from containers (PROC 8a)

9.53.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 459. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		(see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.4. Worker contributing scenario 3: Transfer from/pouring from containers (PROC 8b)

9.53.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 460. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.5. Worker contributing scenario 4: Transfer from/pouring from containers (PROC 9)

9.53.5.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 461. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05

Route of exposure and type of effects	Exposure concentration	Risk characterisation
		Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, long-term:
  Calculated as an 'aqueous solution' in MEASE
- Inhalation, local, acute:
  Calculated as an 'aqueous solution' in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.6. Worker contributing scenario 5: Spraying outside industrial settings and/or applications (PROC 11)

9.53.6.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *75% phosphoric acid*	External Tool (Liquid UK POEM v07)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours *6 hours per day*	External Tool (Liquid UK POEM v07)
Technical and organisational conditions and measures	
• Occupational Health and Safety Management System: Basic	External Tool (Liquid UK POEM v07)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Outdoor	External Tool (Liquid UK POEM v07)

9.53.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 462. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.45 mg/m³** (External Tool (Liquid UK POEM v07))	RCR = 0.042
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.45 mg/m³** (External Tool (Liquid UK POEM v07))	Exposure/DMEL = 0.45 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.9 mg/m³** (External Tool (Liquid UK POEM v07))	Exposure/DMEL = 0.45 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.042

Remarks on exposure data

External Tool (Liquid UK POEM v07)

- Inhalation, systemic, long-term:
  Tractor mounted, hydrolytic nozzle
- Inhalation, local, long-term:
  Tractor mounted, hydrolytic nozzle

- Inhalation, local, acute:
  Tractor mounted, hydrolytic nozzle

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

The airborne concentrations of liquid phosphoric acid as a result of spraying activities are considerably higher than the OEL of 1 mg/m3. Although it is possible to reduce the exposure estimation with the use of LEV and PRE it is considered that in a professional environment both LEV and PRE may not be available, therefore it is necessary to apply a second tier model to assess this activity according to the area of use.
For the outdoor use of fertilisers the UK POEM MODEL of the UK HSE was used. This model contains exposure scenarios for the use of agricultural chemicals by professionals and consumers and offers the choice between various distribution systems. i.e. tractor mounted sprayers to hand-held sprayers. It is therefore considered appropriate that the results obtained from this model be applied to all professional uses that include a spray application as these represent a worst-case. According to this assessment the risks are adequately controlled.

9.53.7. Worker contributing scenario 6: Treatment of articles by dipping and pouring (PROC 13)

9.53.7.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 463. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.8. Worker contributing scenario 7: Use as laboratory reagent (PROC 15)

9.53.8.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 464. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.53.9. Worker contributing scenario 8: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.53.9.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.53.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 465. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.54. Exposure scenario 54: Consumer Use - Fertilizers

Market sector: Fertilisers
PC 12: Fertilizers

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Consumer contributing scenario(s):	
Fertilisers	PC 12

Description of the activities and technical processes covered in the exposure scenario:

Use of fertilisers containing phosphoric acid

ES Short Title for ES communication: Consumer use: fertilisers (PC 12)

Explanation on the approach taken for the ES

This scenario covers household fertilisers containing phosphoric acid including the use of liquid and soluble liquid or solid fertilisers. It includes transfer, loading, unloading, dilution operations and surface spreading of minor quantities for indoor/ outdoor home fertiliser use.

9.54.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.54.2. Consumer contributing scenario 1: Fertilisers (PC 12)

9.54.2.1. Conditions of use

Description of product/article/activity covered:Fertiliser

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.1 g/g	TRA Consumers 3.1
• Exposure via Oral route: Oral exposure is considered to be not relevant	TRA Consumers 3.1
• Concentration of substance in mixture: = 0.25 g/g	External Tool (Liquid UK POEM v07)
• Spray: Yes	External Tool (Liquid UK POEM v07)
• Product/Article subcategory: Lawn and garden preparations	External Tool (Liquid UK POEM v07)
Amount used, frequency and duration of use/exposure	
• Amount of product used per application: = 5E3 g/event *5L tank*	External Tool (Liquid UK POEM v07)
• Exposure time: = 6 hr	External Tool (Liquid UK POEM v07)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	TRA Consumers 3.1
• Place of use: Outdoor	External Tool (Liquid UK POEM v07)
Other conditions affecting consumers exposure	

	Method
• Inhalation factor: = 1	External Tool (Liquid UK POEM v07)

9.54.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 466. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.025 mg/m³** (External Tool (Liquid UK POEM v07)) **Additional data not used for RCR:** 3.636 mg/m³ (TRA Consumers 3.1)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.025 mg/m³** (External Tool (Liquid UK POEM v07))	RCR = 0.069
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (TRA Consumers 3.1)	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (Liquid UK POEM v07)

- Inhalation, systemic, long-term:
  Hand-held spray applications
- Inhalation, local, long-term:
  Hand-held spray applications

Conclusion on risk characterisation

Protective equipment measures: product related design measures are required. These include specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.
For consumer products containing phosphoric acid (concentration <10%) it is recommended to wear hand protection, long sleeves to prevent splashes and eye protection.

Risks adequately controlled.

9.55. Exposure scenario 55: Use by professional worker - Soldering aid: Use of phosphoric acid as a flux agent for soldering.

Market sector: Soldering aids
PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products

Sector of use:
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 16, Manufacture of computer, electronic and optical products, electrical equipment

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Worker contributing scenario(s):	
Roller application or brushing	PROC 10
Hand-Mixing with intimate contact. Use of phosphoric acid as a soldering flux in liquid form.	PROC 19

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; Welding and soldering products (PC 38); ERC 8b, ERC 8e

Explanation on the approach taken for the ES

This scenario covers the use of phosphoric acid as a flux in soldering activities. Typically phosphoric acid is supplied to this use in 85% aqueous solutions therefore aqueous solutions of > 25% are assessed.

9.55.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.55.2. Worker contributing scenario 1: Roller application or brushing (PROC 10)

9.55.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.55.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 467. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.55.3. Worker contributing scenario 2: Hand-Mixing with intimate contact. Use of phosphoric acid as a soldering flux in liquid form. (PROC 19)

9.55.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Phosphoric acid is typically provided to this use in aqueous solutions (85%).*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.55.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 468. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.56. Exposure scenario 56: Consumer Use - Welding and soldering products, (with flux coatings or flux cores), flux products

Market sector: Soldering aids
PC 38: Welding and soldering products (with flux coatings or flux cores.), flux products

Environment contributing scenario(s):	
Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems	ERC 8e, ERC 8b
Consumer contributing scenario(s):	
Flux products	PC 38

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use; welding and soldering products (with flux coatings or flux cores), flux products (PC 38); ERC 8b, ERC 8e

9.56.1. Environmental contributing scenario 1: Wide dispersive outdoor use of reactive substances in open systems; Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.56.2. Consumer contributing scenario 1: Flux products (PC 38)

9.56.2.1. Conditions of use

Description of product/article/activity covered:Liquid solutions of phosphoric acid used as a flux

	Method
Product (article) characteristics	
• Concentration of substance in mixture: = 0.1 g/g *Maximum concentration of phosphoric acid in consumer products*	TRA Consumers 3.1
• Exposure via Dermal route: Yes	TRA Consumers 3.1
• Exposure via Oral route: Oral exposure is considered to be not relevant	TRA Consumers 3.1
• Exposure via Inhalation route: Yes	TRA Consumers 3.1
• Spray: No	TRA Consumers 3.1
Amount used, frequency and duration of use/exposure	
• Frequency of use over a year: Infrequent	TRA Consumers 3.1
• Amount of product used per application: = 5 g/event	TRA Consumers 3.1
• Exposure time: = 4 hr	TRA Consumers 3.1
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Adult/Child assumed: Adult	TRA Consumers 3.1
• Place of use: Indoor	TRA Consumers 3.1
Other conditions affecting consumers exposure	
• Inhalation factor: = 1	TRA Consumers 3.1
• Body parts potentially exposed:	TRA Consumers 3.1
• Dermal transfer factor: = 1	TRA Consumers 3.1

9.56.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 469. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.029 mg/m³** (TRA Consumers 3.1)	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.029 mg/m³** (TRA Consumers 3.1)	RCR = 0.082
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (TRA Consumers 3.1)	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Protective equipment measures: product related design measures are required. These include specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.
For consumer products containing phosphoric acid (concentration <10%) it is recommended to wear hand protection, long sleeves to prevent splashes and eye protection.

Risks to consumers are adequately controlled by using the product according to the label instructions.

9.57. Exposure scenario 57: Use by professional worker - Use in PPE cartridges

Market sector: PPE Cartridges
PC 2: Adsorbents

Sector of use:
SU 1, Agriculture, forestry, fishery
SU 2a, Mining, (without offshore industries)
SU 5, Manufacture of textiles, leather, fur
SU 8, Manufacture of bulk, large scale chemicals (including petroleum products)
SU 9, Manufacture of fine chemicals
SU 10, Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU 11, Manufacture of rubber products
SU 12, Manufacture of plastics products, including compounding and conversion
SU 13, Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU 15, Manufacture of fabricated metal products, except machinery and equipment
SU 18, Manufacture of furniture

Environment contributing scenario(s):	
Wide dispersive indoor use resulting in inclusion into or onto a matrix	ERC 8c
Worker contributing scenario(s):	
Use in closed batch process (synthesis or formulation)	PROC 3
Transfer from/pouring from containers	PROC 9

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; adsorbents (PC 2); ERC 8c

9.57.1. Environmental contributing scenario 1: Wide dispersive indoor use resulting in inclusion into or onto a matrix

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.57.2. Worker contributing scenario 1: Use in closed batch process (synthesis or formulation) (PROC 3)

9.57.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.57.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 470. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.01 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.01 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.01 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves

Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.57.3. Worker contributing scenario 2: Transfer from/pouring from containers (PROC 9)

9.57.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.57.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 471. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic,		RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk characterisation
long-term		

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.58. Exposure scenario 58: Service life (professional worker) - Use of PPE cartridge

Market sector: PPE Cartridges
PC 2: Adsorbents

Article categories:
AC 0, Other (PPE cartridge - articles with foreseeable exposure to dust and fumes during maintenance and recycling processes, e.g. abrasive surface cleaning, dismantling and milling)

Environment contributing scenario(s):	
Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing); Wide dispersive indoor use of long-life articles and materials with low release	ERC 10a, ERC 11a
Worker contributing scenario(s):	
Production of preparations or articles by tabletting, compression, extrusion, pelettisation	PROC 0
Low energy manipulation of substances bound in materials and/or articles	PROC 21

Description of the activities and technical processes covered in the exposure scenario:

Also applies to consumer uses of PPE.

ES Short Title for ES communication: Service life (worker and consumer), other (non-intended to be released): PPE Cartridge (AC 01); ERC 10a, ERC 11a

9.58.1. Environmental contributing scenario 1: Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing); Wide dispersive indoor use of long-life articles and materials with low release

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.58.2. Worker contributing scenario 1: Production of preparations or articles by tabletting, compression, extrusion, pelettisation (PROC 0)

9.58.2.1. Conditions of use

PROC 14: Preparation of preparations or articles by tableting, compression, extrusion, pelletisation

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	

	Method
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.58.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 472. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.02 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.02 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.02 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.58.3. Worker contributing scenario 2: Low energy manipulation of substances bound in materials and/or articles (PROC 21)

9.58.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.58.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 473. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.1 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.2 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.1 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.59. Exposure scenario 59: Use by professional worker - Professional use in orthodontic and dental products

Market sector: Orthodontics, medical devices (PC 0: Other:Other products – medical devices)
PC 0: Other

Sector of use:
SU 20, Health services

Environment contributing scenario(s):	
Wide dispersive indoor use of reactive substances in open systems	ERC 8b
Worker contributing scenario(s):	
Hand-mixing with intimate contact and only PPE available	PROC 19
Mixing and/or application of dental orthodontic materials	PROC 0

Description of the activities and technical processes covered in the exposure scenario:

Used by dentist as an etchant in dental and orthodontic products.

ES Short Title for ES communication: Use by professional workers; other products – medical devices (PC 0), health Services (SU 20); ERC 8b

Explanation on the approach taken for the ES

Phosphoric acid is assessed as an aqueous solution (>25% w/w).

9.59.1. Environmental contributing scenario 1: Wide dispersive indoor use of reactive substances in open systems

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.59.2. Worker contributing scenario 1: Hand-mixing with intimate contact and only PPE available (PROC 19)

9.59.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: >25% *Aqueous solution of phosphoric acid.*	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.59.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 474. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.05 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.05 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.1 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.05 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.59.3. Worker contributing scenario 2: Mixing and/or application of dental orthodontic materials (PROC 0)

9.59.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	External Tool (MEASE)
• Dustiness of material: Low	External Tool (MEASE)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (MEASE)
Technical and organisational conditions and measures	
• Containment: No	External Tool (MEASE)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (MEASE)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Occupational Health and Safety Management System: Basic	External Tool (MEASE)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (MEASE)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374 with basic employee training) [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Process temperature (for liquid): <= 40 °C	External Tool (MEASE)

9.59.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 475. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.02 mg/m³** (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.02 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.02 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.04 mg/m³** (External Tool (MEASE))	Exposure/DMEL = 0.02 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

- Inhalation, systemic, long-term:
  Calculated as PROC 14

- Inhalation, local, long-term:
  Calculated as PROC 14

- Inhalation, local, acute:
  Calculated as PROC 14. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Due to the corrosive nature of phosphoric acid, risk management measures should ensure that direct contact with the material is prevented. For this reason automated and closed systems are preferable for professional applications. Since automated, closed systems and local exhaust ventilation may be less feasible to implement for professional settings, product related design measures should be implemented (e.g. use of low concentrations of phosphoric acid) as well as good practices that prevent direct eye/skin contact with phosphoric acid. The formation of aerosols and mists should be avoided where possible. In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply.
Personal protective equipment is required to prevent eye and skin exposure.

Hand protection: impervious chemical resistant protective gloves:
- material: chloroprene, neoprene, PVC gloves
Eye protection: Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.
If splashes are likely to occur, wear suitable acid resistant protective clothing and natural rubber boots.

Risks are adequately controlled without the need for LEV or PRE.

9.60. Exposure scenario 60: Use by professional worker - Plant protection products Generic Exposure Scenario 1: Spray application of plant protection products containing co-formulants (indoor or outdoor)

Market sector: Use in plant protection products (under Regulation 1107/2009)
PC 27: Plant Protection Products

Sector of use:
SU 1, Agriculture, forestry, fishery

Environment contributing scenario(s):	
Wide dispersive use of processing aids	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Non industrial spraying	PROC 11

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; plant protection products (PC 27), Agriculture, forestry and fishing (SU 1); ERC 8a, ERC 8d

Description of the technical process covered by the SpERC: ECPA SPERC 8d.2.v2

Covers the indoor and outdoor spray application of substances as co-formulants in plant protection products by professional users. Farmers are considered professional users.

The SPERC considers direct emissions to soil and/or air, which for wide dispersive uses are considered only at the regional scale in the existing exposure estimation framework (as described in ECHA R.16 and implemented in the ECETOC TRA). The SPERCs are not intended to provide a definitive estimate of environmental exposure at the local scale.

Explanation on the approach taken for the ES

Phosphoric acid present as a co-formulant in plant protection products at 1%. Exposure is assessed taking into account industry guidance and generic exposure scenarios prepared by the European Crop Protection Agency (ECPA).

9.60.1. Environmental contributing scenario 1: Wide dispersive use of processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.60.2. Worker contributing scenario 1: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

9.60.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5% *Typically present at 1% w/w.*	External Tool (ECPA OWB Version 2.6)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours *Application rate: 1 kg/ha*	External Tool (ECPA OWB Version 2.6)

	Method
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (ECPA OWB Version 2.6)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Occupational Health and Safety Management System: Basic	External Tool (ECPA OWB Version 2.6)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Outdoor *Indoor and Outdoor use*	External Tool (ECPA OWB Version 2.6)

9.60.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 476. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.005 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.01 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.005 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.01 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.005 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.01 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.02 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.005 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE

- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: 1-5%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Basic
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ECPA OWB Version 2.6)

- Inhalation, systemic, long-term:
  Mixing and loading hand-held sprayer (worst-case)

- Inhalation, local, long-term:
  Mixing and loading hand-held sprayer (worst-case)

- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1%, professional users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled.

9.60.3. Worker contributing scenario 2: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

9.60.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5% *Typically present at 1% w/w.*	External Tool (ECPA OWB Version 2.6)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours *Application rate: 1 kg/ha*	External Tool (ECPA OWB Version 2.6)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (ECPA OWB Version 2.6)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Occupational Health and Safety Management System: Basic	External Tool (ECPA OWB Version 2.6)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Outdoor *Indoor and Outdoor use*	External Tool (ECPA OWB Version 2.6)

9.60.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 477. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.005 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.002 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.005 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.002 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.005 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.01 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.004 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.005 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: 1-5%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Basic
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ECPA OWB Version 2.6)

- Inhalation, systemic, long-term:
  Mixing and loading hand-held sprayer (worst-case)
- Inhalation, local, long-term:
  Mixing and loading hand-held sprayer (worst-case)
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1%, professional users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled.

9.60.4. Worker contributing scenario 3: Non industrial spraying (PROC 11)

9.60.4.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5% *Typically present at 1% w/w.*	External Tool (ECPA OWB Version 2.6)

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours *Application rate: 1 kg/ha*	External Tool (ECPA OWB Version 2.6)
Technical and organisational conditions and measures	
• Containment: No	External Tool (ECPA OWB Version 2.6)
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (ECPA OWB Version 2.6)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Occupational Health and Safety Management System: Basic	External Tool (ECPA OWB Version 2.6)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (ECPA OWB Version 2.6)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Outdoor *Indoor and Outdoor use*	External Tool (ECPA OWB Version 2.6)

9.60.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 478. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.035 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.4 mg/m³ (External Tool (MEASE))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.035 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.4 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.035 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.07 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.8 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.035 Qualitative risk characterisation (see below)
Dermal, systemic, long-term		Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: 1-5%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Basic
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]

External Tool (ECPA OWB Version 2.6)

- Inhalation, systemic, long-term:
  Mixing and loading hand-held sprayer (worst-case)
- Inhalation, local, long-term:
  Mixing and loading hand-held sprayer (worst-case)
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1%, professional users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled by the use of LEV and appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.61. Exposure scenario 61: Use by professional worker - Plant protection products Generic Exposure Scenario 2: Direct application of plant protection products (granules or treated seeds) containing co-formulants to soil (indoor or outdoor)

Market sector: Use in plant protection products (under Regulation 1107/2009)
PC 27: Plant Protection Products

Sector of use:
SU 1, Agriculture, forestry, fishery

Environment contributing scenario(s):	
Wide dispersive use of processing aids	ERC 8d, ERC 8a
Worker contributing scenario(s):	
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Use by professional workers; plant protection products (PC 27), Agriculture, forestry and fishing (SU 1); ERC 8a, ERC 8d

Description of the technical process covered by the SpERC: ECPA SPERC 8d.1.v2

Covers the direct application to soil of substances as co-formulants in solid plant protection product formulations (e.g. granules, treated seeds) by professional users. Farmers are considered professional users.

The SPERC considers direct emissions to soil which for wide dispersive uses are considered only at the regional scale in the existing exposure estimation framework. The SPERC is not intended to provide a definitive estimate of environmental exposure at the local scale.

Explanation on the approach taken for the ES

Phosphoric acid present as a co-formulant in plant protection products at 1%. Exposure is assessed taking into account industry guidance and generic exposure scenarios prepared by the European Crop Protection Agency (ECPA).

9.61.1. Environmental contributing scenario 1: Wide dispersive use of processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.61.2. Worker contributing scenario 1: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

9.61.2.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	External Tool (ECPA OWB Version 2.6)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ECPA OWB Version 2.6)
Technical and organisational conditions and measures	

	Method
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (ECPA OWB Version 2.6)
• Local exhaust ventilation: no [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Occupational Health and Safety Management System: Basic	External Tool (ECPA OWB Version 2.6)
• Containment: No	External Tool (ECPA OWB Version 2.6)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: No [Effectiveness Inhal: 0%]	External Tool (ECPA OWB Version 2.6)
• Dermal Protection: Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ECPA OWB Version 2.6)

9.61.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 479. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.3 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.01 mg/m³ (External Tool (MEASE))	RCR = 0.028
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.3 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.01 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.6 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.02 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.3 Qualitative risk characterisation (see below)
Dermal, systemic, long-term	**0.087 mg/kg bw/day** (External Tool (ECPA OWB Version 2.6))	Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Combined routes, systemic, long-term		RCR = 0.028

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: 1-5%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Basic
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ECPA OWB Version 2.6)

- Inhalation, systemic, long-term:
  Mixing and loading granules / treated seeds
- Inhalation, local, long-term:
  Mixing and loading granules / treated seeds
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.
- Dermal, systemic, long-term:
  Mixing and loading granules / treated seeds

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1%, professional users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled.

9.61.3. Worker contributing scenario 2: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

9.61.3.1. Conditions of use

	Method
Product (article) characteristics	
• Concentration of substance in mixture: 1-5%	External Tool (ECPA OWB Version 2.6)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: < 8 hours	External Tool (ECPA OWB Version 2.6)
Technical and organisational conditions and measures	
• General ventilation: Basic general ventilation (1-3 air changes per hour)	External Tool (ECPA OWB Version 2.6)
• Local exhaust ventilation: yes [Effectiveness Inhal: 0%] *Efficiency = 95%*	External Tool (ECPA OWB Version 2.6)
• Occupational Health and Safety Management System: Basic	External Tool (ECPA OWB Version 2.6)
• Containment: No	External Tool (ECPA OWB Version 2.6)
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory Protection: Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	External Tool (ECPA OWB Version 2.6)
Other conditions affecting workers exposure	
• Place of use: Indoor	External Tool (ECPA OWB Version 2.6)

9.61.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 480. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**0.125 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.002 mg/m³ (External Tool (MEASE))	RCR = 0.012
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**0.125 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.002 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.125 Qualitative risk characterisation (see below)
Inhalation, local, acute	**0.25 mg/m³** (External Tool (ECPA OWB Version 2.6)) **Additional data not used for RCR:** 0.004 mg/m³ (External Tool (MEASE))	Exposure/DMEL = 0.125 Qualitative risk characterisation (see below)
Dermal, systemic, long-term	**0.017 mg/kg bw/day** (External Tool (ECPA OWB Version 2.6))	Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Combined routes, systemic, long-term		RCR = 0.012

Remarks on exposure data

External Tool (MEASE)

Remark on exposure estimation

- Inhalation, systemic, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, long-term:
  Calculated as an ‘aqueous solution’ in MEASE
- Inhalation, local, acute:
  Calculated as an ‘aqueous solution’ in MEASE. Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.

Conditions of use leading to the exposure:

- Concentration of substance in mixture: 1-5%
- Containment: No
- Duration of activity: < 8 hours
- General ventilation: Basic general ventilation (1-3 air changes per hour)
- Local exhaust ventilation: no [Effectiveness Inhal: 0%]
- Occupational Health and Safety Management System: Basic
- Process temperature (for liquid): <= 40 °C
- Respiratory Protection: No [Effectiveness Inhal: 0%]

External Tool (ECPA OWB Version 2.6)

- Inhalation, systemic, long-term:
  Transfer of treated seeds from batch treater into bags
- Inhalation, local, long-term:
  Transfer of treated seeds from batch treater into bags
- Inhalation, local, acute:
  Based on long-term value (90th percentile). Modified in accordance with Table R.14-3 of the ECHA guidance on the information requirements and chemical safety assessment Chapter R.14: Occupation exposure estimation.
- Dermal, systemic, long-term:
  Transfer of treated seeds from batch treater into bags

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1%, professional users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled by the use of appropriate personal respiratory equipment (e.g. face mask with inorganic filter).
Workplace monitoring data may also be used to judge the actual workplace exposure and subsequently can be used to reduce the requirements for respiratory protection provided the exposure levels do not exceed the DNELs.

9.62. Exposure scenario 62: Consumer Use - Use in plant protection products (under Regulation 1107/2009)

Market sector: Use in plant protection products (under Regulation 1107/2009)
PC 27: Plant Protection Products

Environment contributing scenario(s):	
Wide dispersive use of processing aids	ERC 8d, ERC 8a
Consumer contributing scenario(s):	
Plant Protection Products	PC 27
Plant Protection Products	PC 27

Description of the activities and technical processes covered in the exposure scenario:

ES Short Title for ES communication: Consumer use: plant protection products (PC 27), Agriculture, forestry and fishing (SU 1); ERC 8a, ERC 8d

Description of the technical process covered by the SpERC: ECPA SPERC 8d.2.v2

Covers the indoor and outdoor spray application of substances as co-formulants in plant protection products by consumers. The SPERC considers direct emissions to soil and/or air, which for wide dispersive uses are considered only at the regional scale in the existing exposure estimation framework (as described in ECHA R.16 and implemented in the ECETOC TRA). The SPERCs are not intended to provide a definitive estimate of environmental exposure at the local scale.

Explanation on the approach taken for the ES

Phosphoric acid present as a co-formulant in plant protection products at 1%. Exposure is assessed taking into account industry guidance and generic exposure scenarios prepared by the European Crop Protection Agency (ECPA).

9.62.1. Environmental contributing scenario 1: Wide dispersive use of processing aids

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

9.62.2. Consumer contributing scenario 1: Plant Protection Products (PC 27)

9.62.2.1. Conditions of use

Generic Exposure Scenario 3 - Use as a co-formulant in plant protection products, spray application by consumers. Task 1: Mixing and loading liquid formulation into knapsack sprayer

	Method
Product (article) characteristics	
• Exposure via Oral route: Oral exposure is considered to be not relevant	External Tool (ECPA OWB v.3.2 19 March 2015)
• Concentration of substance in mixture: = 0.01 g/g	External Tool (ECPA OWB v.3.2 19 March 2015)
• Exposure via Inhalation route: Yes	External Tool (ECPA OWB v.3.2 19 March 2015)
• Exposure via Dermal route: Yes	External Tool (ECPA OWB v.3.2 19 March 2015)
• Spray: Yes	External Tool (ECPA OWB v.3.2 19 March

	Method
	2015)
• Product/Article subcategory: Lawn and garden preparations	External Tool (ECPA OWB v.3.2 19 March 2015)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Place of use: Outdoor	External Tool (ECPA OWB v.3.2 19 March 2015)

9.62.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 481. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**1E-4 mg/m³** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**1E-4 mg/m³** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**0.143 mg/kg bw/day** (External Tool (ECPA OWB v.3.2 19 March 2015))	Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1% no specific consumer measures are recommended. Users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled.

9.62.3. Consumer contributing scenario 2: Plant Protection Products (PC 27)

9.62.3.1. Conditions of use

Generic Exposure Scenario 3 - Use as a co-formulant in plant protection products, spray application by consumers. Task 2: Hand-held spraying outdoors

	Method
Product (article) characteristics	
• Exposure via Oral route: Oral exposure is considered to be not relevant	External Tool (ECPA

	Method
	OWB v.3.2 19 March 2015)
• Concentration of substance in mixture: = 0.01 g/g	External Tool (ECPA OWB v.3.2 19 March 2015)
• Exposure via Inhalation route: Yes	External Tool (ECPA OWB v.3.2 19 March 2015)
• Exposure via Dermal route: Yes	External Tool (ECPA OWB v.3.2 19 March 2015)
• Spray: Yes	External Tool (ECPA OWB v.3.2 19 March 2015)
• Product/Article subcategory: Lawn and garden preparations	External Tool (ECPA OWB v.3.2 19 March 2015)
Measures related to information and behavioural advice to consumers including personal protection and hygiene	
• Place of use: Outdoor	External Tool (ECPA OWB v.3.2 19 March 2015)

9.62.3.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 482. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	**8E-4 mg/m³** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Inhalation, systemic, acute		Qualitative (see below)
Inhalation, local, long-term	**8E-4 mg/m³** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Inhalation, local, acute		Qualitative (see below)
Dermal, systemic, long-term	**0.063 mg/kg bw/day** (External Tool (ECPA OWB v.3.2 19 March 2015))	Qualitative (see below)
Dermal, systemic, acute		Qualitative (see below)
Dermal, local, long-term		Qualitative (see below)
Dermal, local, acute		Qualitative (see below)
Eye, local		Qualitative (see below)
Oral, systemic, long-term	**0 mg/kg bw/day** (External Tool (ECPA OWB v.3.2 19 March 2015))	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Conclusion on risk characterisation

Since phosphoric acid is present at ca. 1% no specific consumer measures are recommended. Users are advised to following label instructions with regards to the appropriate PPE according to the classification of the final formulation.

Risks are adequately controlled.

10. RISK CHARACTERISATION RELATED TO COMBINED EXPOSURE

10.1. Human health

>>> NOTE: When relevant select the combinations of exposure scenarios which could result in simultaneous exposure of humans and report the outcome of the assessment here. <<<

10.1.1. Workers

10.1.2. Consumer

10.2. Environment (combined for all emission sources)

Exposure assessment and risk characterisation are not required (see scope under 9.0.2).

REFERENCES

Al-Ani Farouk Y and Al-Lami salah K. (1988). Absence of mutagenic activity of acidity regulators in the Ames Salmonella / microsome test. Mutation Research, 206: 467-470.

Alkahem H. F. (1989). Effect of different acids on the freshwater fish, Aphanius dispar. J. Biol. Sci. Res., Vol. 20(3), p. 537-545. Testing laboratory: King Saud University, Department of Zoology, Riyadh 11451, Kingdom of Saudi Arabia.

Arena JM (1970). No title available. Poisoning: Toxicology, Symptoms, Treatments. 2nd Edition. Charles C Thomas, Springfield, Illinois. p73.

BASF Gewerbehygiene und Toxikologie (1980a). Vergleichende Pruefung der primaeren Hautreizwirjung von "Sokalan SMK" und "Phosphorsaeure 19 %ig" and der Rueckenhaut weisser Kaninchen nach 4 stuendiger Einwirkung. Testing laboratory: BASF Gewerbehygiene und Toxikologie. Owner company: BASF. Report date: 1980-05-05.

BASF Gewerbehygiene und Toxikologie (1980b). Vergleichende Pruefung der primaeren Hautreizwirjung von "Sokalan SMK" und "Phosphorsaeure 80 %ig" and der Rueckenhaut weisser Kaninchen nach Fed. Reg., Section 1500.41. Testing laboratory: BASF Gewerbehygiene und Toxikologie. Owner company: BASF. Report date: 1980-05-05.

Bailey DE & Morgareidge K (1975). Teratologic Evaluation of FDA 73-2, Monosodium phosphate, anhydrous in Mice and Rats - Final rept. Testing laboratory: Food and Drug Research Laboratories, Inc. Report no.: FDABF-GRAS-346. Owner company: U. S. Food and Drug Adminiatration (FDA) 200 "C" Street SW, Washington DC 20204 USA. Study number: NTIS PB245521, FDABF-GRAS-340. Report date: 1975-03-21.

Becker J and Parke G (1975a). The effects of MCTR-1-75 on the Eye Mucosa of New Zealand Albino Rabbits. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M14-75. Owner company: Mobil Chemical Company, Research and Development Laboratories, P. O. BOX 240, Edison, New Jersey 08817. Study number: PS-3703. Report date: 1975-04-30.

Becker J and Parke G (1975b). A Primary dermal irritation study of MCTR 1-75 on abraded and nonabraded skin of New Zealand albino rabbits. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M15-75. Owner company: Mobil Chemical Company, Research and Development Laboratories, P. O. BOX 240, Edison, New Jersey 08817. Study number: PS-3704. Report date: 1975-03-07.

Becker J and Parke G (1976). Report on rabbit eye irritation. Compound: MCTR-51-76. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M511-76. Owner company: Mobil Chemical Company, Research and Development Laboratories, P. O. BOX 240, Edison, New Jersey 08817. Study number: CL_M511-76. Report date: 1976-07-15.

Becker J, Parke E (1975). The acute dermal toxicity study of MCTR-1-75, New Zealand Albino rabbits. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M13-75. Owner company: Mobil Chemical Company, Research and development laboratories, P. O. Box 240, Edison, New Jersey 08817. Study number: PS-3702. Report date: 1975-04-28.

Bibra toxicology advice and consulting (1993a). Toxicity Profile: Phosphoric acid and common inorganic phosphates. Bibra.

Bibra toxicology advice and consulting (1993b). Toxicity Profile: Phosphoric acid and common inorganic phosphates. Bibra toxicology advice and consulting.

Block G, Matanoski GM, Seltser R & Mitchell T (1988). Cancer morbidity and mortality in phosphate workers. Cancer Research. 48: 7298-7303.

Bonting S. L. and Jansen B. C. (1956). The effect of a prolonged intake of phosphoric acid and citric acid in rats. Voeding 17: 137-148. Testing laboratory: Netherlands Institute of Nutrition and Laboratory of Physiological Chemistry, University of Amsterdam, Netherlands.

Bonting SL (1952a). the effect of a prolonged intake of phosphoric acid and citric acid in rats.

Bonting SL (1952b). The effect of prolonged intake of phosphoric acid and citric acid in rats.

Bonting SL (1956). The effect of a prolonged intake of phosphoric acid and citric acid in rats. Voeding 17: 137-148.

Brown RW (2010). Liquid phophoric acid 85%: L5178 TK +/- Mouse Lymphoma Assay. Testing laboratory: Harlan Laboratories Ltd, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK. Report no.: 3045/0001. Owner company: IP/FARM consortium c/o GPN 16-40 Rue Henri Regnault, 92902 PARIS, FRANCE. Study number: Harlan 3045-0001. Report date: 2012-01-19.

Bucher K Bucher KE and Walz, D (1981). The topically irritant substance: Essentials-bio-tests-predictions. Agents and Actions, 11: 515-519.

Bullock and Kamienski (1971a). 52% Phosphoric Acid Primary Skin Irritation — Rabbits. Report no.: T-1777. Owner company: Stauffer Chemical Company. Study number: PS-2856.

Bullock and Kamienski (1971b). 70% Wet Phosphoric Acid Dermal Irritation. Report no.: T-1731. Owner company: Stauffer Chemical Company. Study number: PS-2845.

Bushman DH, Emerick RJ & Embry LB (1965). Incidence of urinary calculi in sheep as affected by various dietary phosphates. J Anim Sci 1965. 24:671-675.

Caravati EM (1987). Metabolic Abnormalities Associated With Phosphoric Acid Ingestion. Ann Emerg Med, 16: 904-906.

Cello JP, Fogel RP, Boland CR (1980). Liquid Caustic Ingestion. Spectrum of Injury. Arch Intern Med - Vol 140, pages 501-504.

Choi S. A, Hong E. K (2008). Bacterial reverse mutation test of phosphoric acid using microorganisms. Testing laboratory: Medvill Co. Ltd. Report no.: G01-08085. Owner company: National Institute of Environmental Research (NIER) Korea. Report date: 2008-11-24.

Chrostek W and Murphy DC (1984). Health hazard Evaluation Report No. HETA-82-281-1503, Stauffer Chemical Company, Morrisville, Pennsylvania.

Cipollaro M, Corsale G, Esposito A, Ragucci E, Staiano N, Giordano GG, Pagano G (1986). Sublethal pH Decrease May Cause Genetic Damage to Eukaryotic Cell: A Study on Sea Urchins and Salmonella typhimurium. Teratogenesis, Carcinogenesis, and Mutagenesis 6: 275-287.

Crookshank H. R, Keating F. E, Burnett E, Jones J. H, Davis R. E (1960). Effect of chemical and enzymatic agents on the formation of urinary calculi in fattening steers. J. Anim Sci 1960. 19:595-600. Testing laboratory: United States Department of Agriculture and the Texas Agricultural Experiment Station.

Demerec M, Bertani G, Flint J (1951). A survey of chemicals for mutagenic action on E. Coli. The American Naturalist, 85 (No. 821), 119-136.

Dymsza HA et al. (1959). Effect of Normal and High Intakes of Orthophosphate and Metaphosphate in Rats. J. Nutrition 69, 419 - 428 (1959). Testing laboratory: Research Center, General Foods Corporation, Tarrytown, New York.

Elam CJ, Schneider BH and Ham WE (1956). Experimetally produced urinary canuli in sheep. J Anim Sci 1956. 15:800-810.

Ellgaard EG and Gilmore JY III (1984). Effects of different acids on the bluegill sunfish, Lepomis macrochirus Rafinesque. J. Fish Biol., 25 (2): 133-137. Testing laboratory: Tulane University, Department of Biology, New Orleans, LA 70118, USA.

Ellinger RH (1972). Nazario 1952. Rev. Instit. Adolpho, Lutz; cited in Phosphates in food processing. Furia, TE (Ed.), handbook of Food additives, Vol. I. The Chemical Rubber Company, Cleveland, OH.

Fabbri L. (1977). Chronic broncopneumopathy and pneumoconiosis in workers employed in phosphoric acid

production. Lavoro Umano 27: 50-57.

Fazekas IG (1954). Hypertrophy of the parathyroid gland induced by simple acidotic compounds. Virchows Arch. 324(5):531-42; PMID: 13169687.

Freeman C (1988). Modified Primary Skin Irritation Study in Rabbits. Testing laboratory: FMC TOXICOLOGY LABORATORY 301 COLLEGE ROAD EAST PRINCETON, NEW JERSEY 08543. Report no.: I88-1050. Owner company: FMC Corporation. Study number: F28. Report date: 1989-03-03.

Frosch P J and Kligman A M (1977). A method for appraising the stinging capacity of topically applied substances. J Soc Cosmet Chem 28 197-209. Toxicity review 30- Phosphoric acid, Phosphorus pentoxide, Phosphorus oxychloride, Phosphorus pentachloride, Phosphorus pentasulphide; Payne MP, Shillaker RO, Wilson AJ, 1993.

Grant WM (1974). Toxicology of the Eye. 2nd Edition. Charles C. Thomas. Springfield, Illinois.

Gueylard F and Duval M (1922). Toxicité comparée de divers acides pour les Poissons (Epinoches). C. R. Acad. Sci. 175, p.1243-1245.

H Vryenhoef D M Mullee (2010). PHOSPHORIC ACID TECHNICAL GRADE: ALGAL GROWTH INHIBITION TEST. Testing laboratory: Harlan Laboratories Ltd Shardlow Business Park Shardlow Derbyshire DE72 2GD UK. Report no.: 2920-0145. Owner company: Inorganic Phosphate Consortium c/o ReachCentrum Avenue E. Van Nieuwenhuyse 6 B-1160 Brussels BELGIUM. Report date: 2010-08-23.

Hahn F, Jacobi H, Seifen E. (1958). Are orthophosphate and polyphosphates of different compatibility in prolonged feeding tests? (Article in German). Arzneimittelforschung; 8(5):286-9; PMID 13535379.

Haskell Laboratory for Toxicology and Industrial Medicine (1964a). Eye irritation test. Testing laboratory: Haskell Laboratory for Toxicology and Industrial Medicine. Report no.: 33-64. Owner company: E. I. du Pont de Nemours and Company. Study number: PA_HL-33-64_1964_Dupont. Report date: 1964-03-17.

Haskell Laboratory for Toxicology and Industrial Medicine (1964b). Eye irritation test. Testing laboratory: Haskell Laboratory for Toxicology and Industrial Medicine. Report no.: 412-70. Owner company: E. I. du Pont de Nemours and Company. Study number: PA_HL-33-64_1970_Dupont. Report date: 1970-09-29.

Haut LL, Alfrey AC, Guggenheim S, Buddington B, Schrier N. (1980). Renal toxicity of phosphate in rats. Kidney Int.; 17(6):722-31; PMID: 7412107.

Hawkins DB, Demeter MJ, Barnett TE (1980). Caustic ingestion: controversies in management. A review of 214 cases. The laryngoscope 90: 98 - 109.

Henkel AG & Co. (1977). Skin irritation study with phosphoric acid. Testing laboratory: no data. Owner company: Henkel AG & Co.

Hicks JS, Hackett DS & Sprague GL. (1987). Toxicity and aluminium concentration in bone following dietary administration of two sodium aluminium phosphate formulations in rats. Food Chem Toxicol. 1987 Jul;25(7):533-8. PMID: 3623343.

Hitchman AJ, Hasany SA, Hitchman A, Harrison JE, Tam C (1979). Phosphate induced renal calcification in the rat. Can J Physiol Pharmac 57(1):92-7.

Hodge HC (1956). Short-term oral toxicity tests of condensed phosphates in rats and dogs. Testing laboratory: Division of Pharmacology and Toxicology University of Rochester School of Medicine and Dentistry Rochester, New York. Owner company: Calgon Company, division of Hagan Chemicals & Controls, Inc., Pittsburgh, Pennsylvania. Study number: H1. Report date: 1956-10-19.

Hoechst AG (1968a). Toxicological Assessment of Cleaning Agent Components. Testing laboratory: Pharma-Forschung/Laboratorium fur Gewerbe-und Arzneimitteltoxikologie. Report no.: 111/68. Owner company: Hoechst AG.

Hoechst AG (1968b). Toxicological Assessment of Cleaning Agent Components. Testing laboratory: Pharma-Forschung/Laboratorium fur Gewerbe-und Arzneimitteltoxikologie. Report No. Report no.: 111/68. Owner

company: Hoechst AG.

Imlay P, Parke E (1977). Report on the acute dermal toxicity of rabbits. Compound: MCTR-192-77. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M1922-77. Owner company: Mobil Chemical Company, Research and development laboratories, P. O. Box 240, Edison, New Jersey 08817. Study number: AW_acute dermal... Report date: 1977-08-23.

Ishii H, Kaji T and Noguchi J (1981). Measurement of the toxicity of chemicals to the activated sludge. Suishitsu Odadu Kengyu 4(4), p. 197-203. Testing laboratory: Fuji Photo Film Co. Ltd., Minami-ashigara, Kanagawa, Japan.

Ivy RE, Sullivan TW, Goldner WJ, Graff CR & Peo FR (1972). Availability and toxicity of fertiliser phosphates in the rat. Abstracts of papers presented at the 63rd annual meeting of the Poultry Science Association, Inc.

Jacobs GA & Martens MA (1989). An objective method for the evaluation of eye irritation in vivo. Fd Chem. Toxic. 27(4): 255-258.

Jacobs GA (1992). Two dilutions of phosphoric acid tested on eye. J. Am. Coll. Toxicol. 11(6): 724.

Jagoe CH, Haines TA, Kircheis FW (1984). Effects of reduced pH on three life stages of Sunapee Char Salvelinus alpinus. Bull. Environ. Contam. Toxicol. 33: 430-438.

Katz AC, Zwicker GM, Sauerhoff MW and Frank DW (1981). A 6-month subchronic dietary toxicity study with LEVAIR in Beagle dogs. Testing laboratory: Stauffer Chemical Company, Environmental Health Center, 400 Farmington Ave. Farmington, CT 06032. Report no.: T-10195. Study number: PS-2947. Report date: 1981-07-31.

Kim S. H, Lee B. K (2005). In vitro chromosome aberration test of Phosphoric acid (CAS No. 7664-38-2) using mammalian cultured cells. Testing laboratory: Biotoxtech Co., Ltd. Report no.: R051545. Owner company: National Institute of Environmental Research (NIER), Korea. Report date: 2005-10-09.

Laboratory for Commercial and Pharmaceutical Toxicology (1968). Toxicological Assessment of Cleaning Agent Components. Testing laboratory: Laboratory for Commercial and Pharmaceutical Toxicology. Report no.: 111/68. Owner company: Hoescht AG = Clariant /Thermphos. Report date: 1968-04-18.

Lacey FE (2013). Phosphoric acid: Chromosome Aberration Test in Human Lymphocytes in vitro. Testing laboratory: Harlan Laboratories Ltd. Shardlow Business Park Shardlow Derbyshire DE72 2GD UK. Report no.: 41301393. Owner company: Inorganic Phosphates Consortium Members c/o ReachCentrum Avenue E. Van Nieuwenhuyse 6 B-1160 Brussels BELGIUM. Study number: Harlan 41301393. Report date: 2013-11-20.

Larson P, Finnegan JK and Haag HB (1956). Observations of the effect of chemical configuruation on the edema-producing potency of acid, aldehydes, ketones, and alcohols. Pharamc. Exp. Ther. 116: 119-122.

Lauersen F (1952). Über gesundheite bedeken bei der verwendung von phosphorsäure and primären phosphat in eirfrischungsgetränken. Mitteilung aus dem Tuberkulose Forschungsinstitut, Institut für experimentelle Biologie und Medizin, Borstel. Report date: 1952-11-18.

Lewis AC & Palanker AL (1979). Dermal corrosion rabbit. Compound: MCTR-67-79. Testing laboratory: Consumer Product Testing, Building number 2-15B, 1275 Bloomfield Avenue, Fairfiel, New Jersey 07006. Report no.: 79230-1. Owner company: Mobil Oil Corporation, P. O. Box 1026, Princeton, New Jersey 08540. Study number: PS-3705. Report date: 1979-06-26.

Libuda L (2008). Association between long-term consumption of soft drinks and variables of bone modeling and remodeling in a sample of healthy German children and adolescents. Am J Clin Nutr 2008; 88:1670-7.

Loden M, Häggqvist I and Karlsson N (1985). The dermal irritancy/corrosion of 20 compounds in aqeous solutions. Testing laboratory: National Defense Research Institute, ABC Research Department, S-901 82 UMEA, Sweden. Report no.: FOA Report E 40023. Owner company: National Environment Protection Board.

Malm O J (1952). On phosphates and phosphoric acid as dietary factors in the calcium balance of man. Scand J Clin Lab Invest 5 75-84. Report date: 1952-08-06.

Mastalski K (1972a). 90-day subacute oral toxicity study with KASAL in beagle dogs. Testing laboratory: Industrial Bio-Test Laboratories Inc. 1810 Frontage Road, Northbrook, Illinois 60062. Report no.: T-6687 / IBT J749. Owner company: Monsanto Company, 800 North Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: PS-2934. Report date: 1972-06-21.

Mastalski K (1972b). 90-day subacute oral toxicity study with levn-lite in beagle dogs. Testing laboratory: Industrial Bio-Test Laboratories Inc. 1810 Frontage Road, Northbrook, Illinois 60062. Report no.: BTL-71-49 C. Owner company: Monsanto Company, 800 North Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: BK4. Report date: 1972-06-21.

Matsuzaki H, Kikuchi T, Kajita Y, Masuyama R, Uehara M, Goto S, Suzuki K (1999). Comparison of various phosphate salts as the dietary phosphorus source on nephrocalcinosis and kidney function in rats. J Nutr Sci Vitaminol (Tokyo); 45(5):595-608; PMID: 10683811.

Matsuzaki H, Masuyama R, Uehara M, Nakamura K, Suzuki K (2001). Greater effect of dietary potassium tripolyphosphate than of potassium dihydrogenphosphate on the nephrocalcinosis and proximal tubular function in female rats from the intake of a high-phosphorus diet. Biosci Biotechnol Biochem. 65(4):928-34; PMID: 11388474.

Mazariegos-Ramos E, Guerrero-Romero F, Rodriguez-Moran M, Lazcano-Burciaga G, Paniagua R, Amato D (1995). Consumption of soft drinks with phosphoric acid as a risk factor for the development of hypocalcemia in children: A case-control study. J. Pediatr, 12.

McFarlane D (1941). Experimental phosphate nephritis in the rat. J. Pathol. 52: 17-24; DOI 10.1002/path.1700520103.

McMeniman N. P. (1973). The toxic effect of some phosphate supplements fed to sheep. Australian Veterinary Journal, Vo. 49, March 1973.

McMeniman NP (1973). The toxic effect of some phosphate supplements fed to sheep. Aust Vet J. 49(3):150-2; PMID: 4707166.

Menendez R (1976). Chronic effects of reduced pH on brook trout (Salvelinus fontinalis). J. Fish. Res. Board Can. 33: 118-123. Testing laboratory: Department of Natural Resources, Division of Wildlife Resources, Elkins, West Virginia, USA.

N Clarke (2010). Dipotassium hydrogenorthophosphate: ASSESSMENT OF THE INHIBITORY EFFECT ON THE RESPIRATION OF ACTIVATED SEWAGE SLUDGE. Testing laboratory: Harlan Laboratories Ltd Shardlow Business Park Shardlow Derbyshire DE72 2GD UK. Report no.: 2920-0121. Owner company: Inorganic Phosphate Consortium c/o ReachCentrum Avenue E. Van Nieuwenhuyse 6 B-1160 Brussels BELGIUM. Report date: 2010-06-18.

National Institute of Environmental Research (2008). Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test of Phosphoric acid in rats. Testing laboratory: Biotoxtech Co., Ltd. Report no.: B08008. Owner company: National Institute of Environmental Research. Report date: 2008-10-30.

National Institute of Environmental Research (NIER) (2005). Acute toxicity test of Phosphoric acid to Daphnia magna. Testing laboratory: Korea Institute of Toxicology, Korea Research Institute of Chemical Technology (KRICT). Report no.: EG05041.

National Institute of Environmental Research (NIER) (2007). Growth inhibition test of Phosphoric acid to the alga, Pseudokirchneriella subcapitata. Testing laboratory: Korea Institute of Toxicology, Korea Research Institute of Chemical Technology (KRICT). Report no.: EG07063.

National Institute of Environmental Research (NIER), Korea (2005a). A single-dose oral toxicity study of phosphoric acid in Sprague-Dawley rats (Acute toxic class method). National Institute of Environmental Research (NIER), Korea.

National Institute of Environmental Research (NIER), Korea (2005b). Acute Toxicity Test of Phosphoric acid to Red Killifish, Oryzias latipes. Testing laboratory: Korea Institute of Toxicology, Korea Research Institute of Chemical Technology(KRICT). Report no.: EG05040.

Pettersen JC, Zwicker GM and Hackett DS (1987). 26-week subchronic toxicity study with KASAL in dogs. Testing laboratory: Stauffer Chemical Company, Environmental Health Center, 400 Farmington Ave. Farmington, CT 06032. Report no.: T-12969. Study number: PS-2804. Report date: 1987-10-12.

Randall DJ & Robinson EC (1976). Acute toxicologic evaluation of various concentrations of phosphoric acid. Testing laboratory: Monsanto Company, Dept. of Med. & Health Sciences, 800 North Lindenbergh Blvd., St. Louis, MO 63167. Owner company: Monsanto Company.

Randall DJ & Robinson EC (1977a). Skin Irritation Tests on Various Concentrations of Phosphoric Acid. Testing laboratory: Monsanto Company-Dept. of Med. & Health Sciences, St. Louis, Mo. Owner company: Monsanto Company. Study number: PA_RANDALL_1975-77.

Randall DJ & Robinson EC (1977b). Skin Irritation Tests on Various Concentrations of Phosphoric Acid. Testing laboratory: Monsanto Company-Dept. of Med. & Health Sciences, St. Louis, Mo. Owner company: Monsanto Company. Study number: PA_Randall_1975-77.

Randall DJ and Robinson EC (1976). Acute toxicological evaluation of various concentrations of phosphoric acid. Testing laboratory: Monsanto Company, Dept. of Med. & Health Sciences, 800 North Lindenbergh Blvd., St. Louis, MO 63167. Owner company: Monsanto Company.

Renke W, Winnicka A, Graczyk M (1987). Estimation of occupational hazards of the employees of a phosphate fertilizers plant. Toxicity review 30-Phosphoric acid, phosphorus pentoxide, phosphorus oxychloride, phosphorus pentachloride, phosphorus pentasulphide. Payne MP, Shillaker RO, Wilson AJ, 1993.

Reyna MS (1973). 90-day subacute oral toxicity study with levn-lite in female albino rats. Testing laboratory: Industrial Bio-Test Laboratories, Inc. 1810 Frontage Road, Northbrook, Illinois 60062. Report no.: BTL-71-49 D. Owner company: Monsanto Company, 800 North Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: BK2. Report date: 1973-05-11.

Reynolds T (1975). pH restraints on lettuce fruit germination. Ann. Bot. 39, 797-805. Testing laboratory: Jodrell Laboratory, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3DS, United Kingdom.

Ritskes-Hoitinga J, Lemmens AG, Beynen AC (1989). Nutrition and kidney calcification in rats. Lab Anim.; 23(4):313-8; PMID: 2811270.

S L Priestly D M Mullee (2010). PHOSPHORIC ACID TECHNICAL GRADE: ACUTE TOXICITY TO DAPHNIA MAGNA. Testing laboratory: Harlan Laboratories Ltd Shardlow Business Park Shardlow Derbyshire DE72 2GD UK. Report no.: 2920-0144. Owner company: Inorganic Phosphate Consortium c/o ReachCentrum Avenue E. Van Nieuwenhuyse 6 B-1160 Brussels BELGIUM. Study number: Harlan 2920/0144. Report date: 2010-09-10.

Saxton JA jr. & Ellis GH (1941). Effects of long-continued ingestion of sodium phosphate upon the parathyroids, kidneys and bones of mature rats. Am J Path. 1941, 17: 590.

Schneider P, Ober K M and Ueberberg H (1981). Contribution to the phosphate-induced nephropathy in the dog. Comparative light and electron microscopic investigations on the proximal tubule after oral appliction of K2HPO4, Na2HPO4, KCl and NaCl. Exp. Path. 19, 53 - 65 (1981). Testing laboratory: Abteilung für experimentelle Pathologie, c/o Dr. Karl Thomae GmbH, D-7950 Biberach/Riss BRD.

Schneider P, Ober KM, Ueberberg H. (1981). Contribution to the phosphate-induced nephropathy in the dog. Comparative light and electron microscopic investigations on the proximal tubule after oral application of K2HPO4, Na2HPO4, KCl and NaCl. Exp Pathol.; 19(1):53-65; PMID: 7262273.

Schneider P, Pappritz G, Müller-Peddinghaus R, Bauer M, Lehmann H, Ueberberg H and Trautwein G (1980a). Die Kaliumhydrogenphosphat-induzierte Nephropathie des Hundes. I. Pathogenese der Tubulusatrophie. [Potassium Hydrogen Phosphate Induced Nephropathy in the dog. I Pathogenesis of Tubular Atrophy]. Vet. Pathol. 17: 699 - 719 (1980). Testing laboratory: Abteilung für Experimentelle Pathologie, Dr. Karl Thomae GmbH, Biberach/Riss, und Institut für Pathologie, Tierärztliche Hochschule Hannover, Hannover, BRD.

Schneider P, Pappritz G, Müller-Peddinghaus R, Bauer M, Lehmann H, Ueberberg H and Trautwein G (1980b). Die Kaliumhydrogenphosphat-induzierte Nephropathie des Hundes. II. Glomeruläre Veränderungen. [Potassium Hydrogen Phosphate Induced Nephropathy in the dog. I Glomerular alterations]. Vet. Pathol. 17: 720 - 737

(1980). Testing laboratory: Abteilung für Experimentelle Pathologie, Dr. Karl Thomae GmbH, Biberach/Riss, und Institut für Pathologie, Tierärztliche Hochschule Hannover, Hannover, BRD.

Scholz and Weigand (1964). Testing laboratory: Knapsack bei Koln. Anorganisches Laboratorium. Knapsack - Griesheim. Report no.: 3342. Owner company: Thermphos. Study number: 93/64.

Sekizawa J, Yasuhara K, Suyama Y, Yamanaka S, Tobe M and Nishimura M (1994a). A simple method for screening assessment of skin and eye irritation. J Toxicol Sci. 1994 Feb; 19(1):25-35.

Sekizawa J, Yasuhara K, Suyama Y, Yamanaka S, Tobe M and Nishimura M (1994b). A simple method for screening assessment of skin and eye irritation. J Toxicol Sci. 19(1):25-35.

Sigova N. V. (1983). Toxicological Characteristics of Phosphoric Acid and Some of its Chromium Salts Used as Binding Agents in the Production of Refractory Materials. Gig. Truda prof. Patol. Tsv. cher. Metallurg. M, 65. Cited in: Bibra toxicology/advice and consulting. 1993. Toxicity Profile: Phosphoric acid and common inorganic phosphates.

Sigova NV (1983a). Toxicological Characteristics of Phosphoric Acid and Some of Its Chromium Salts Used as Binding Agents in the Production of Refractory Materials. Gig. Truda prof. Patol. Tsv. cher. Metallurg. M, 65.

Sigova NV (1983b). Toxicological Characteristics of Phosphoric Acid and Some of Its Chromium Salts Used as Binding Agents in the Production of Refractory Materials. Gig. Truda prof. Patol. Tsv. cher. Metallurg. M, 65.

Smith PS (1972a). 90-day subacute oral toxicity study with levn-lite in albino rats. Testing laboratory: Industrial Bio-Test Laboratories Inc. 1810 Frontage Road, Northbrook, Illinois 60062. Report no.: BTL-71-49 B. Owner company: Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: BK1. Report date: 1972-06-28.

Smith PS (1972b). 30-day pilot study with levair, kasal and leven-lite in albino rats. Testing laboratory: Industrial Bio-Test Laboratories Inc. 1810 Frontage Road, Northbrook, Illinois 60062. Report no.: BTL-71-49 A. Owner company: Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: BK3. Report date: 1972-01-31.

Smith PS (1972c). 90-day subacute oral toxicity study with KASAL in albino rats. Testing laboratory: Industrial Bio-Test Laboratories Inc. Report no.: IBT B747. Owner company: Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: PS-2807. Report date: 1972-06-28.

Smith PS (1972d). 90-day subacute oral toxicity study with LEVAIR in albino rats. Testing laboratory: Industrial Bio-Test Laboratories Inc. Report no.: IBT B747. Owner company: Monsanto Company, 800 N. Lindbergh Boulevard, St. Louis, Missouri 63166. Study number: PS-2751. Report date: 1972-06-28.

Sprague GL (1986). 4-week dietary comparative toxicity study with kasal in rats. Testing laboratory: Stauffer Environmental health Center. Report no.: T-12644. Owner company: Stauffer Chemical Company. Study number: PS-2969. Report date: 1986-05-07.

Stayner LT, Meinhardt T, Lemen R, Bayliss D, Herrick R, Reeve G, Smith AB & Halperin W (1985). A retrospective cohort mortality study of a phosphate fertiliser production facility. Archives of Environmental Health. 40:133-138.

Sterner RT (1993). Whole-body exposures to a phosphoric acids aerosol: II. Food/water/weight effects in wild rodent and avian species. Journal of Toxicology and Environmental Health, 39: 497-515. Testing laboratory: USDA/APHIS/ADC, Denver Wildlife Research Center, Denver, CO, USA.

Summaries published by BIBRA (1964). Summaries of toxicological data. Fd Cosmet. Toxicol. Vol. 2 pp. 147-154. Pergamon Press 1964.

Swain, EE, Jr. (1974). Department of transportation skin corrosion test on rabbit skin. Testing laboratory: Haskell Laboratory for Toxicology and Industrial Medicine. Report no.: 498-74. Owner company: E. I. du Pont de Nemours & Company. Report date: 1974-09-13.

Terrell Y, Parke E (1975a). Study: Acute oral toxicity in rats - Compound: MCTR-1-75. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: M11-75. Owner

company: Mobil Chemical Company, Research and Development Laboratories, P. O. BOX 240, Edison, New Jersey 08817. Study number: PS-3700. Report date: 1975-04-28.

Terrell Y, Parke E (1975b). Study: Acute oral toxicity in rats - Compound: MCTR-1-75. Testing laboratory: Cannon Laboratories Inc, P. O. BOX 3627, Reading, PA 19606. 375-4536. Report no.: PS-3701. Owner company: Mobil Chemical Company, Research and Development Laboratories, P. O. BOX 240, Edison, New Jersey 08817. Study number: M12-75. Report date: 1975-05-12.

Thompson P W (2010). PHOSPHORIC ACID TECHNICAL GRADE: REVERSE MUTATION ASSAY "AMES TEST" USING SALMONELLA TYPHIMURIUM AND ESCHERICHIA COLI. Testing laboratory: Harlan Laboratories Ltd Shardlow Business Park Shardlow Derbyshire DE72 2GD UK. Report no.: 2920/0142. Owner company: Inorganic Phosphate Consortium c/o ReachCentrum Avenue E. Van Nieuwenhuyse 6 B-1160 Brussels BELGIUM. Study number: Harlan 2920-0142. Report date: 2010-08-25.

Townsend LD and Cheyne H (1944). The influence of hydrogen ion concentration on the minimum dissolved oxygen toleration of the silver salmon, Oncorhynchus Kisutch (Walbaum). Ecology, 25(4), pp. 461-466.

Van Esch GJ, Vink HH, Wit SJ and Van Genderen H. (1957). The physiological effect of phosphates. Arzneimittel Forsch 7, 172-175.

Von Brehm J. and Meijering M. P. D. (1982). On the sensitivity to low pH of some selected crustaceans (Daphnia and Gammarus, Crustacea). Arch. Hydrobiol. 95 (1/4) p. 17-27. Testing laboratory: Max Planck Institut fur Limnologie, Schlitz, Germany. Report date: 1982-10-01.

Von Burg R (1992). Phosphoric Acid/Phophates, a Review. Journal of Applied Toxicology 12(4): 301-303.

Vyskocilova, Sindelka, Zapletal (1983). Observation of General health of workers in the production of phosphoric acid.

Wallen IE, Greer WC and Lasater R (1957). Toxicity to Gambusia affinis of certain pure chemicals in turbid waters. Sewage and industrial wastes, 29(6), p. 695-711. Testing laboratory: Zoology Department and Research Foundation, Oklahoma Agricultural and Mechanical College, Stillwater, OK, USA.

Warren N (2014a). Phosphoric acid 5%: In vitro skin corrosion in the EpiSkin(TM) Reconstructed Human Epidermis Model. Testing laboratory: Harlan Laboratories Ltd., Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK. Report no.: 41304434. Owner company: Inorganic Phosphates Consortium c/o ReachCentrum, Avenue E. Van Niewenhuyse 6, B-1160 Brussels, BELGIUM. Study number: Harlan 41304434. Report date: 2014-11-24.

Warren N (2014b). Phosphoric acid 20%: In vitro skin corrosion in Episkin(TM) reconstructed human epidermis model. Testing laboratory: Harlan Laboratories Ltd, Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK. Report no.: 41304436. Owner company: Inorganic Phosphates Consortium c/o ReachCentrum, Avenue E. Van Niewenhuyse 6, B-1160 Brussels, Belgium. Study number: Harlan 41300436. Report date: 2014-11-24.

Warren N (2014c). Phosphoric acid 10%: In vitro skin corrosion in the Episkin(TM) reconstructed human epidermis model. Testing laboratory: Harlan Laboratories Ltd., Shardlow Business Park, Shardlow, Derbyshire, DE72 2GD, UK. Report no.: 41304335. Owner company: Inorganic Phosphates Consortium c/o ReachCentrum, Avenue E. Van Nieuwenhuyse 6, B-1160 Brussels, Belgium. Study number: Harlan 41304335. Report date: 2014-11-24.

Weiner ML (2001). Toxicological review of inorganic phosphates. Food and Chemical Toxicoogy. 39:759-786.

Young JR, How MJ, Walker AP and Worth MH (1988). Classification as corrosive or irritant to skin of preparations containing acidic or alkaline substances, without testing on animals. Toxic. In Vitro Vol. 2, No. 1, pp. 19-26.