

SECCIÓN 1: Identificación de la sustancia o la mezcla y de la sociedad o la empresa

1.1. Identificador del producto

Forma del product	: Sustancia
Razón comercial	: Ácido fosfórico
Conocido químico	: ácido ortofosfórico
No Índice	: 015-011-00-6
No CE	: 231-633-2
No CAS	: 7664-38-2
REACH número de registro	: 01-2119485924-24-XXXX
Código de producto	: Emaphos - 001
Fórmula química	: H3PO4
Sinónimos	: ácido ortofosfórico, E338, EMP2
Grupo de productos	: ácido

1.2. Usos pertinentes identificados de la sustancia o de la mezcla y usos desaconsejados

1.2.1. Usos pertinentes identificados

Previsto para el público en general

Uso de la sustancia o preparado : Producto utilizado como es, en la formulación o formulación de productos para :
Aditivo alimentario

1.2.2. Usos desaconsejados

Título	Descriptor de utilización	Razón
Ácido fosfórico		Ninguno(a)

Texto completo de los descriptores del uso: vea la sección 16.

1.3. Datos del proveedor de la ficha de datos de seguridad

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Reachcustomer@prayon.be - www.prayon.be

1.4. Teléfono de emergencia

País	Organismo consultivo oficial	Dirección	Número de urgencia
SPAIN	Unitat de Toxicologia Clínica Servicio de Urgencias	Hospital Clinic I Provincial de Barcelona C/Villarroel, 170 E-08036Barcelona	+34 93 227 98 33 +34 93 227 54 00 bleep 190
SPAIN	Instituto de Toxicología	C/Merced 1 8002Barcelona	+34 93 317 44 00
SPAIN	Servicio de Información Toxicológica Instituto Nacional de Toxicología, Departamento de Madrid	Calle Luis Cabrera 9 E-28002Madrid	+34 91 562 04 20
SPAIN	Servicio de Información Toxicológica Instituto Nacional de Toxicología, Departamento de Sevilla	Carretera de San Jerónimo Km 0,4 E-41080Sevilla	+34 95 437 12 33

SECCIÓN 2: Identificación de los peligros

2.1. Clasificación de la sustancia o de la mezcla

Clasificación según reglamento (UE) No. 1272/2008 [CLP]

Skin Corr. 1B H314

Texto completo de las frases H: ver sección 16.

Clasificación según las directivas 67/548/CEE o 1999/45/CE

C; R34

Texto completo de las frases R: ver sección 16

Efectos adversos fisicoquímicos, para la salud humana y el medio ambiente

No se dispone de más información

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

2.2. Elementos de la etiqueta

Etiquetado según el reglamento (CE) No. 1272/2008 [CLP]

Pictogramas de peligro (CLP) :



GHS05

Palabra de advertencia (CLP) : Peligro

Indicaciones de peligro (CLP) : H314 - Provoca quemaduras graves en la piel y lesiones oculares graves.

Consejos de prudencia (CLP) : P260 - No respirar el polvo, el humo, el gas, la niebla, los vapores, el aerosol.
P280 - Llevar guantes de protección, prendas de protección, gafas de protección, máscara de protección.
P301+P330+P331 - EN CASO DE INGESTIÓN: Enjuagarse la boca. NO provocar el vómito.
P305+P351+P338 - EN CASO DE CONTACTO CON LOS OJOS: Aclarar cuidadosamente con agua durante varios minutos. Quitar las lentes de contacto, si lleva y resulta fácil. Seguir aclarando.
P310 - Llamar inmediatamente a un CENTRO DE INFORMACION TOXICOLOGICA o a un médico.
P303+P361+P353 - EN CASO DE CONTACTO CON LA PIEL (o el pelo): Quitarse inmediatamente las prendas contaminadas. Aclararse la piel con agua o ducharse.
P234 - Conservar únicamente en el recipiente original.

2.3. Otros peligros

Esta sustancia/mezcla no cumple con los criterios de PBT de las disposiciones REACH, anexo XIII.

Esta sustancia/mezcla no cumple con los criterios de vPvB de las disposiciones REACH, anexo XIII.

SECCIÓN 3: Composición/información sobre los componentes

3.1. Sustancias

Nombre : Ácido fosfórico

No CAS : 7664-38-2

No CE : 231-633-2

No Índice : 015-011-00-6

Nombre	Identificador del producto	%	Clasificación según la directiva 67/548/CEE
Acido ortofosfórico	(No CAS)7664-38-2 (No CE)231-633-2 (No Índice)015-011-00-6	30 - 85	C; R34

Nombre	Identificador del producto	%	Clasificación según reglamento (UE) No. 1272/2008 [CLP]
Acido ortofosfórico	(No CAS)7664-38-2 (No CE)231-633-2 (No Índice)015-011-00-6	30 - 85	Skin Corr. 1B, H314

Texto completo de las frases R, H y EUH : ver sección 16

3.2. Mezclas

No aplicable

SECCIÓN 4: Primeros auxilios

4.1. Descripción de los primeros auxilios

Medidas de primeros auxilios en caso de inhalación : En caso de molestias respiratorias persistentes, llamar a un médico o solicitar ayuda médica urgente. Sacar la víctima al aire libre.

Medidas de primeros auxilios en caso de contacto con la piel : Retirar la ropa y el calzado contaminados. Después contacto con la piel, lavar inmediatamente con un producto adecuado y enjuagar abundantemente con agua (20 - 30 minutos). Lavar las prendas contaminadas antes de volver a usarlas. Llamar a un médico.

Medidas de primeros auxilios en caso de contacto con los ojos : Con ayuda de un separador de párpados, aclarar abundantemente con agua durante 20-30 minutos. Llamar a un médico.

Medidas de primeros auxilios en caso de ingestión : En caso de ingestión, enjuagar la boca con agua (solamente si la persona está consciente). No provocar el vómito. Llamar a un médico.

4.2. Principales síntomas y efectos, agudos y retardados

Síntomas y lesiones : El vapor causa irritación leve en los ojos, la garganta y la piel.

Síntomas y lesiones posibles en caso de contacto con la piel : Quemaduras en caso de contacto con la piel.

Ácido fosfórico

Fichas de datos de seguridad

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4.3. Indicación de toda atención médica y de los tratamientos especiales que deban dispensarse inmediatamente

Puede considerarse una endoscopia o un lavado gástrico, pero puede causar daños graves en el estómago o en el esófago.

SECCIÓN 5: Medidas de lucha contra incendios

5.1. Medios de extinción

Medios de extinción apropiados : CO2. Polvo. Espuma. Pulverización con agua.
Material extintor inadecuado : No utilice un flujo potente de agua.

5.2. Peligros específicos derivados de la sustancia o la mezcla

Peligro de incendio : No inflamable.
Peligro de explosión : El contacto con metales produce hidrógeno que puede formar mezclas explosivas con el aire.
Reactividad : Reacciona a los alcalis fuertes. El contacto con metales puede provocar el desprendimiento de hidrógeno inflamable.

5.3. Recomendaciones para el personal de lucha contra incendios

Instrucciones para extinción de incendio : Enfriar mediante nebulizaciones/vaporizaciones de agua.
Protección durante la extinción de incendios : Llevar ropa de protección completa anti-ácido, guantes y botas. Utilice un aparato de protección respiratoria autónoma. SECCIÓN 8.

SECCIÓN 6: Medidas en caso de vertido accidental

6.1. Precauciones personales, equipo de protección y procedimientos de emergencia

6.1.1. Para el personal que no forma parte de los servicios de emergencia

No se dispone de más información

6.1.2. Para el personal de emergencia

Unidades Protectoras : El vertido debe ser manejado por personal de limpieza entrenado adecuadamente, equipado con ropa de protección completa anti-ácido, guantes y botas (sección 8)."
Planos de emergencia : Mantener al público alejado de la zona de peligro.

6.2. Precauciones relativas al medio ambiente

Limpie todos los vertidos tan pronto como sea posible, utilizando un material absorbente para recoger el vertido. Evitar la penetración en alcantarillas y aguas potables. Evitar la contaminación solar.

6.3. Métodos y material de contención y de limpieza

Procesos de limpieza : Ventilar la zona. Transferir en un recipiente apropiado y etiquetado con el fin de proceder a un tratamiento posterior. Neutralizar con carbonato sódico, carbonato cálcico o cal. Enjuague con abundante agua.

6.4. Referencia a otras secciones

Véase la sección 8 y 13 para obtener más información.

SECCIÓN 7: Manipulación y almacenamiento

7.1. Precauciones para una manipulación segura

Precauciones para una manipulación segura : Una buena ventilación del lugar de trabajo es necesaria. Respete los límites de exposición que se especifican en la hoja con los datos de seguridad de este producto. Utilizar material apropiado. Utilizar preferentemente técnicas de bombeo para verter o descargar. Proporcionar un sistema de retención adaptado. Evitar todo contacto con esta sustancia. No respirar los vapores. Nunca introducir agua ni un agente acuoso en los depósitos o contenedores. Las diluciones o neutralizaciones son altamente exotérmicas. Evitar: Salpicadura. En caso de disolución, echar siempre el ácido en el agua y no a la inversa. No mezclar con : materiales incompatibles (véase sección 10.5).
Medidas de higiene : Lavarse las manos y otras áreas expuestas con un jabón suave y agua antes de comer, beber, fumar y abandonar el trabajo. No comer, ni beber, ni fumar durante su utilización. Retirar la ropa y el calzado contaminados.

7.2. Condiciones de almacenamiento seguro, incluidas posibles incompatibilidades

Condiciones de almacenamiento : Manténgase en un lugar seco, fresco y bien ventilado. Mantener alejado de los álcalis, sulfuros, cianuros y polvos metálicos. No almacenar bajo la luz directa del sol. Conservar a temperatura ambiental por encima del punto de cristalización. Materiales compatibles. Acero inoxidable. Polietileno de alta densidad. Vidrio.

7.3. Usos específicos finales

No se dispone de más información

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

SECCIÓN 8: Controles de exposición/protección individual

8.1. Parámetros de control

Ácido fosfórico(7664-38-2)		
UE	IOELV TWA (mg/m ³)	1 mg/m ³
UE	IOELV STEL (mg/m ³)	2 mg/m ³
UE	Notas	DIR 2000/39/CE
Bélgica	Valor límite (mg/m ³)	1 mg/m ³
Bélgica	Corta duración (mg/m ³)	2 mg/m ³
Francia	VLE (mg/m ³)	1 mg/m ³
Francia	VME (mg/m ³)	2 mg/m ³

Ácido fosfórico(7664-38-2)	
DNEL/DMEL (Trabajadores)	
A largo plazo - efectos locales, inhalación	2,92 mg/m ³
DNEL/DMEL (Población general)	
A largo plazo - efectos locales, inhalación	0,73 mg/m ³
PNEC (Agua)	
PNEC agua (de agua dulce)	pH: 6-9

8.2. Controles de la exposición

Controles técnicos apropiados	: Utilizar en procesos cerrados (por ejemplo, transferencia en circuito cerrado). Una buena ventilación del lugar de trabajo es necesaria. Asegurar un control regular de la atmósfera. Refiera por favor al anexo (situaciones d' exposición).
Equipo de protección individual	: Prever fuentes de emergencia para el lavado de ojos y duchas de seguridad en las áreas con riesgo de exposición.
Protección de las manos	: Use guantes resistentes a productos químicos con el tema EN 374:3". Consulte al proveedor del guante."
Protección ocular	: Gafas químicas (goggles) o pantalla de mano con gafas de seguridad de acuerdo EN 166..
Protección de la piel y del cuerpo	: Usar ropa de protección de un modelo adecuado para la proyección de riesgo y resistentes a la acidez (prueba de resistencia según la norma EN 368- 369). Zapatos de seguridad impermeables, de goma.
Protección de las vías respiratorias	: Utilícese exclusivamente en zonas bien ventiladas. Donde pueda producirse excesivo de aerosol o de vapor, utilice un equipamiento de protección apropiado (con filtro EN 143)".
Limitación y vigilancia de la exposición ambiental	: Utilizar preferentemente técnicas de bombeo para verter o descargar.

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

SECCIÓN 9: Propiedades físicas y químicas

9.1. Información sobre propiedades físicas y químicas básicas

Forma/estado	: Líquido viscoso.
Masa molecular	: 98 g/mol
Color	: Incoloro.
Olor	: Acre.
Umbral olfativo	: No hay datos disponibles
pH	: 0
Grado de evaporación (acetato de butilo=1)	: No hay datos disponibles
Punto de fusión	: 30%: -11,8 °C - 50%: -41,9 °C - 62,5%: -85 °C - 70%: -43 °C - 85%: +21,1 °C
Punto de solidificación	: No hay datos disponibles
Punto de ebullición	: 30%: 101,8 °C - 50%: 108 °C - 85%: 158 °C
Punto de inflamación	: No inflamable
Temperatura de autoignición	: No aplicable
Temperatura de descomposición	: No hay datos disponibles
Inflamabilidad (sólido, gas)	: No aplicable
Presión de vapor	: No aplicable
Densidad relativa de vapor a 20 °C	: No hay datos disponibles
Densidad relativa	: No hay datos disponibles
Densidad	: 30%: (25 °C) 1,1794 g/cm ³ - 50% - 85%:(25 °C) 1,3334 - 1,6850 g/cm ³
Solubilidad	: Agua: 100 %
Log Pow	: No hay datos disponibles
Log Kow	: No hay datos disponibles
Viscosidad, cinemático	: No hay datos disponibles
Viscosidad, dinámico	: 30%-85%: (30 °C) 2.0-32 mPa.s
Propiedades explosivas	: No explosivo(a).
Propiedad de provocar incendios	: No hay datos disponibles
Límites de explosión	: No explosivo(a). vol %

9.2. Información adicional

Otras propiedades	: Punto de cristalización= 75% : -20°C / 80% : 4 °C / 81.5% : 7 °C / 85% : 21 °C.
Otras indicaciones	: Miscible con agua

SECCIÓN 10: Estabilidad y reactividad

10.1. Reactividad

Reacciona a los alcalis fuertes. El contacto con metales puede provocar el desprendimiento de hidrógeno inflamable.

10.2. Estabilidad química

Estable en condiciones normales de manipulación y almacenaje.

10.3. Posibilidad de reacciones peligrosas

En contacto con sulfuros y cianuros, desprende un gas tóxico.

10.4. Condiciones que deben evitarse

Luz.

10.5. Materiales incompatibles

Alcali. Productos cáusticos. Metales no nobles.

10.6. Productos de descomposición peligrosos

Puede liberar gases tóxicos.

SECCIÓN 11: Información toxicológica

11.1. Información sobre los efectos toxicológicos

Toxicidad aguda : No clasificado

Ácido fosfórico(7664-38-2)	
DL50 oral rata	2600 mg/kg de peso corporal OECD 423
DL50 cutánea rata	(Sin datos específicos)
CL50 inhalación rata (mg/l)	(Sin datos específicos)

Corrosión o irritación cutáneas : Corrosivo
pH: 0

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

Lesiones o irritación ocular graves	: Corrosivo pH: 0
Sensibilización respiratoria o cutánea	: No clasificado Irrelevante. Producto corrosiv
Mutagenicidad en células germinales	: No mutagénico. OECD 471/473/476
Carcinogenicidad	: Ningun sospettato agente canceroso.
Toxicidad para la reproducción	: No clasificado como tóxico para la reproducción (CE). Desarrollo de la toxicidad: NOAEL: \geq 410 mg/kg bw, rata, OECD 422. Fertilidad: NOAEL \geq 500 mg/kg bw/day, rata, OECD 422
Toxicidad específica en determinados órganos (STOT) – exposición única	: No clasificado
Toxicidad específica en determinados órganos (STOT) – exposición repetida	: No clasificado

Ácido fosfórico(7664-38-2)	
NOAEL (oral,rata,90 días)	250 mg/kg de peso corporal/día OECD 422
NOAEL (dérmica,rata/conejo,90 días)	No hay datos disponibles
NOAEL (inhalación,rata,gas,90 días)	No hay datos disponibles
Peligro por aspiración	: Sin peligros significativos.

SECCIÓN 12: Información ecológica

12.1. Toxicidad

Ácido fosfórico(7664-38-2)	
CL50 peces 1	3 - 3,25 mg/l (96h) <i>Lepomis macrochirus</i>
CE50 Daphnia 1	> 100 mg/l (48h) <i>Daphnia magna</i> , OECD 202
ErC50 (algas)	> 100 mg/l (72h) <i>Desmodesmus subspicatus</i> , OECD 201
NOEC cronica algas	100 mg/l (72h) <i>Desmodesmus subspicatus</i> , OECD 201

12.2. Persistencia y degradabilidad

Ácido fosfórico(7664-38-2)	
Persistencia y degradabilidad	Irrelevante.

12.3. Potencial de bioacumulación

Ácido fosfórico(7664-38-2)	
Potencial de bioacumulación	Irrelevante.

12.4. Movilidad en el suelo

Ácido fosfórico(7664-38-2)	
Movilidad en el suelo	No hay datos disponibles

12.5. Resultados de la valoración PBT y mPmB

Ácido fosfórico(7664-38-2)	
Esta sustancia/mezcla no cumple con los criterios de PBT de las disposiciones REACH, anexo XIII.	
Esta sustancia/mezcla no cumple con los criterios de vPvB de las disposiciones REACH, anexo XIII.	

12.6. Otros efectos adversos

Otros efectos adversos : Ninguno(a).

SECCIÓN 13: Consideraciones relativas a la eliminación

13.1. Métodos para el tratamiento de residuos

Procedimiento para el tratamiento de residuos	: Eliminar el producto de conformidad con la normativa local. Neutralizar con carbonato sódico, carbonato cálcio o cal.
Indicaciones complementarias	: Cuándo totalmente vacía contenedores are reciclable como cualquier otro empaqueteando. Los envases de almacenamiento deben estar limpios de contaminación antes de usarlos. Destruir cumpliendo las condiciones de seguridad exigidas por la legislación local/nacional.
Ecología - desechos	: Ver el catálogo europeo de los residuos.

SECCIÓN 14: Información relativa al transporte

Según los requisitos de ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. Número ONU

UN No. : 1805

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

14.2. Designación oficial de transporte de las Naciones Unidas

Designación oficial para el transporte : ÁCIDO FOSFÓRICO LÍQUIDO
Descripción del documento del transporte : UN 1805 ÁCIDO FOSFÓRICO LÍQUIDO, 8, III, (E)

14.3. Clase(s) de peligro para el transporte

Clase (UN) : 8
Etiquetas de peligro (UN) : 8



14.4. Grupo de embalaje

Grupo de embalaje (UN) : III

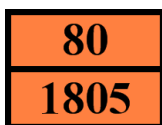
14.5. Peligros de contaminación

Otra información : Ninguna otra información disponible.

14.6. Precauciones particulares para los usuarios

14.6.1. Transporte por vía terrestre

Peligronº (código Kemler) : 80
Código de clasificación (UN) : C1
Panel naranja :



Clave de limitación de túnel : E
LQ : LQ07
Cantidades exceptuadas (ADR) : E1

14.6.2. Transporte marítimo

Ship Safety Act : Corrosivo
Port Regulation Law : Corrosivo
No. GPA : 154

14.6.3. Transporte aéreo

Civil Aeronautics Law : Corrosivo

14.7. Transporte a granel con arreglo anexo II del Convenio MARPOL 73/78 y del Código IBC

No aplicable

SECCIÓN 15: Información reglamentaria

15.1. Reglamentación y legislación en materia de seguridad, salud y medio ambiente específicas para la sustancia o la mezcla

15.1.1. UE-Reglamentos

Sin restricciones según el anexo XVII de REACH

No contiene ninguna sustancia candidata

Otras instrucciones, límites especiales y disposiciones legales : No es una sustancia Seveso. No reduce la capa de ozono. No es un contaminante orgánico persistente.

15.1.2. Reglamentos nacionales

Clase de peligro de agua (WGK) : 1 - Presenta poco peligro para el agua

15.2. Evaluación de la seguridad química

Una evaluación de la seguridad química ha sido efectuada

SECCIÓN 16: Otra información

Indicación de modificaciones:
conforme al reglamento (CE) nº 1907/2006 (REACH).

Fuente de datos : Expediente Reach.

Ácido fosfórico

Fichas de datos de seguridad

conforme al reglamento (CE) nº 453/2010

Abreviaciones y acrónimos	: ADN: European Agreement concerning international carriage of Dangerous goods by Inland waterways ADR: European Agreement concerning international carriage of Dangerous goods by Road AF : Assessment factor BCF : Bioconcentration factor Bw: Body weight CAS: Chemical Abstracts Service CLP : Classification, labelling, packaging CSR: Chemical Safety Report DMEL : Derived maximum effect level DNEL: Derivative No effect Level EC: European Community ELV : Emission limit values EN: European Norm EUH: European Hazard Statement EWC : European Waste catalogue IATA: International Air Transport Association ICAO: International Civil Aviation Organization IMDG: International Maritime Dangerous Goods LC50: Median lethal concentration LD50 : Median lethal dose NOAEL : No-observed-adverse-effect-level NOEC : No observed effect concentration NOEL : No observed effect level OEL : Operator exposure level PBT: Persistent, bioaccumulative, Toxic PEC : Predicted effect level PNEC: Predicted No effect Concentration REACH : Registration, evaluation and autorisation of chemicals RID: Regulations concerning the international carriage of dangerous goods by rail STEL: Short Term Exposure Limit TWA : Time weighted average vPvB: Very persistent, very bioaccumulative.
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Consejo del entrenamiento : Ningún.

Texto completo de las frases R, H y EUH ::

Skin Corr. 1B	cauterización/irritación de la piel Categoría 1B
H314	Provoca quemaduras graves en la piel y lesiones oculares graves.
R34	Provoca quemaduras.
C	Corrosivo

FDS UE (Anexo II REACH)

Esta información se basa en nuestro conocimiento actual y tiene como finalidad describir el producto para los propósitos de los requisitos de salud, seguridad y medio ambiente únicamente. Por lo tanto, no debe ser interpretada como garantía de ninguna característica específica del producto. EXENCIÓN DE RESPONSABILIDAD – Las informaciones incluidas en la presente ficha provienen de fuentes que consideramos fiables. No obstante, se ofrecen sin ninguna garantía, expresa o tácita, de su exactitud. Las condiciones o los métodos de manipulación, almacenaje, utilización o eliminación del producto están fuera de nuestro control y puede que no sean objeto de nuestras competencias. Por estas razones entre otras, declinamos toda responsabilidad en caso de pérdida, daños o gastos ocasionados (o bien asociados de algún modo a dichos factores) por la manipulación, el almacenamiento, la utilización o la eliminación del producto. La presente ficha de datos de seguridad (FDS) ha sido elaborada para este producto y sólo debe utilizarse a dicho efecto. En el caso de que el producto se utilice como componente de otro producto, es posible que las informaciones que aquí se incluyen no sean aplicables.



ORTHOPHOSPHORIC ACID

EC number : 231-633-2

CAS number : 7664-38-2

Exposure scenarios

Réf: version2_Feb2012

SUMMARY OF EXPOSURE SCENARIOS
Orthophosphoric acid



ORTHOPHOSPHORIC ACID

EC number : 231-633-2


CAS number : 7664-38-2

Exposure scenarios

Réf: version2_Feb2012

Annex: summary of relevant exposure scenarios

ES2: Industrial use of orthophosphoric acid3
ES3: Professional use of orthophosphoric acid13
ES4: Consumer use of orthophosphoric acid22

	ORTHOPHOSPHORIC ACID EC number : 231-633-2 CAS number : 7664-38-2	Exposure scenarios Réf: version2_Feb2012
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ES2: Industrial use of orthophosphoric acid

1. Short title of exposure scenario 2	
Industrial use of orthophosphoric acid	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 3: Industrial uses: uses of substances as such or in preparations at industrial sites SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) SU4: Manufacture of food products SU 9: Manufacture of fine chemicals SU 10: formulation (mixing) of preparations and/or repackaging (excluding 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
Product category (PC)	PC 0: other PC 1: Adhesives PC 7: Base metals and alloys PC 9a: Coatings and paints, thinners, paint removers PC 9b: Fillers, putties, plasters, modelling clay PC 13: Fuels PC 14: Metal surface treatment products, including galvanic and electroplating products PC 19: Intermediate 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 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment products PC 39: Cosmetics, personal care products
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 14: Production of preparations or articles by tableting, compression, extrusion,

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	pelletisation. PROC 15: Use as laboratory reagent. PROC 19: Hand-mixing with intimate contact and only PPE available. PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature.
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 2 (Formulation of preparations) ERC 3: Formulation in materials. ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles. ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates). ERC 6b (Industrial use of reactive processing aid) ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	8 hours/day
Frequency of exposure at workplace:	Once a day
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid (including aqueous solutions)
Concentration of substance in mixture	The concentration of phosphoric acid in industrial application ranges from 10 to 100% and worst case will be taken into account.
3.3 Other relevant operational conditions	
No information about frequency and duration of the various tasks is available. In the first-tier assessment of exposure a frequency of once a day and an exposure duration of 8 hours was considered. Workers are unlikely to be permanently subject to actual or potential exposure during the entire working shift.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	The employer must ensure that the required PPE is available and used according to instructions (provide training if necessary). PPE are required when breaching the system or handling the pure substance and concentrated solutions. Safety showers and eye washes are installed to be available in the case of accidental contact.



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Technical measures	<ul style="list-style-type: none"> • Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) • Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) (Good practice) • Use of pliers, grip arms with long handles with manual use “to avoid direct contact and exposure by splashes (no working over one’s head)” (Good practice) • Store in cool, dry, clean, well ventilate areas. (Good practice). • Local exhaust / general ventilation should be present – see below for processes requiring ventilation.
Respiratory protection	<p>Respiratory protection: Personal Respiratory Equipment (PRE): In situations where aerosols, mists or fogs may be formed it is suggested to wear an all over facemask, containing an appropriate inorganic acid filter or an all-over face mask connected to a fresh air supply (PRE is not required when handling solid phosphoric acid). See below for processes requiring PRE.</p> <p>As modelling tools are likely to produce an over-estimate of the exposure to phosphoric acid, in instances where the company handling the phosphoric acid has workplace monitoring data to show that actual exposures are not a concern it is anticipated that personal respiratory equipment and /or LEV may not be necessary.</p>
Hand protection	<p>Hand protection is required: Impervious chemical resistant protective gloves are required.</p> <p>Material of gloves. Chloroprene, Neoprene or PVC gloves</p>
Eye protection	<p>Wearing of eye/face protection is required. Goggles or face protection shield should be consistent with EN 166 or equivalent.</p>
Skin and body protection	<p>Wearing of suitable protective clothing and rubber boots is required.</p>
Hygiene measures	<p>Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.</p>
4.2 RMMs related to the environment	
Organisational measures	<p>Emissions to the environment must meet the requirements of Council Directive 96/61/EC and national regulations concerning phosphate in industrial water. Regular control of the pH value previous to or during introduction of process wastewaters into open waters is required. In general, discharges should minimise pH changes in receiving surface waters.</p>
Abatement measures related with wastewater	<p>The efficiency of the process is maximised in such a way that minimal emission of phosphates into the wastewater will occur. In addition, phosphate can be precipitated from the wastewater by addition of metal ions. Phosphoric acid waste should be reused or discharged to the industrial wastewater and further neutralised if needed.</p>
Abatement measures waste air and solid waste	<p>Phosphoric acid is not expected to be found in the solid waste or to reach the air compartment, due to its low vapour pressure. Therefore, no specific risk management measures for air emissions are provided.</p>
4.3 Waste related measures	
Type of waste	<p>Liquid waste, solid residues, packaging material</p>
Disposal technique	<p>The release of phosphates to wastewater is highly regulated, In addition pH changes in receiving waters should be minimised. The residue of the containers or the used container itself should be disposed in accordance with local and national requirements. See Section 13 of the SDS for more information.</p>



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Fraction released to environment during waste treatment	Not determined. The pH of wastewater released from manufacturing sites should be between pH 6-9.
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5. Prediction of exposure and comparison of predicted exposure with DNELs (Risk Characterisation)

5.1. Human exposure

Exposure estimation tool(s)	Workers, inhalation: MEASE
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Workers (oral)	The industrial use of orthophosphoric acid will not result in exposure via the oral route. It is assumed that workers in industrial settings adhere to the principles of good working practice and as such do not eat, smoke or drink near chemicals. Therefore no DNEL or assessment is required.
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Orthophosphoric acid is corrosive to the eyes. The use of safety goggles is compulsory. Further, some processes require the use of LEV and/or PRE (see below). As modelling tools are likely to produce an over-estimate of the exposure to phosphoric acid, in instances where the company handling the phosphoric acid has workplace monitoring data to show that actual exposures are not a concern it is anticipated that personal respiratory equipment and /or LEV may not be necessary. The risk characterisation ratios (RCR) have only been derived for the long-term DNEL for inhalation. Any acute effects via inhalation are also covered with this risk characterisation. Since phosphoric acid is corrosive to the skin, dermal exposure has been addressed qualitatively in the exposure scenarios and indications on the relevant and required RMM (PPE) have been given.

Workers (inhalation)

RCR workers, Industrial activities – phosphoric acid, liquid

DNEL/OEL:
Worker, long-term, systemic, inhalation:
4.07 mg/m³

Process Category (PROC)	LEV	Duration (hours)	PRE (% efficiency)	Content (% w/w)	Inhalation exposure (mg/m3)	RCR	Conclusion
1 - Use in closed process, no likelihood of exposure	No	> 4	No	25 to 100	0.04	0.04	Risk adequately controlled
2 - Use in closed, continuous process with occasional controlled exposure	No	> 4	No	25 to 100	4.008	4.008	RMMs required to control risk
	Yes medium efficiency	> 4	No	25 to 100	0.721	0.721	Risk adequately controlled
3 – use in closed batch process (synthesis or formulation)	No	> 4	No	25 to 100	12.025	12.025	RMMs required to control risk
	Yes medium efficiency	> 4	No	25 to 100	2.164	2.164	RMMs required to control risk
	Yes medium efficiency	> 4	75%	25 to 100	0.541	0.541	Risk adequately controlled



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	4 – use in batch or other process (synthesis) where opportunity for exposure arises	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	3.607	3.607	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled
	5 – Mixing or blending in in batch processes for formulation of preparations and articles (multistage and/or significant contact)	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	3.607	3.607	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled
	7- Industrial spraying. (MEASE)	No	> 4	No	25 to 100	400.818	400.818	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	72.147	72.147	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	18.037	18.037	RMMs required to control risk
	7- Industrial spraying. (ART)	Yes 90% efficiency	> 4	50%*	25 to 100	0.55	0.55	Risk adequately controlled
	8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. (MEASE)	No	> 4	No	25 to 100	40.082	40.082	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	7.215	7.215	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	1.804	1.804	RMMs required to control risk
	8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. (ART)	Yes 50% efficiency	> 4	No	25 to 100	0.49	0.49	Risk adequately controlled
	8b – transfer of chemicals from/to vessels/large containers at dedicated facilities	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk
Yes medium efficiency		> 4	No	25 to 100	3.607	3.607	RMMs required to control risk	
Yes medium efficiency		> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled	
9 – transfer of chemicals into small containers (dedicated	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk	

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	filling line)	Yes medium efficiency	> 4	No	25 to 100	3.607	3.607	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled
	10 - Roller application or brushing (MEASE).	No	> 4	No	25 to 100	40.082	40.082	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	7.215	7.215	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	1.804	1.804	RMMs required to control risk
	10 - Roller application or brushing (ART).	Yes 50% efficiency	> 4	No	25 to 100	0.55	0.55	Risk adequately controlled
	13 - Treatment of articles by dipping and pouring (MEASE)	No	> 4	No	25 to 100	40.082	40.082	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	7.215	7.215	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	1.804	1.804	RMMs required to control risk
	13 - Treatment of articles by dipping and pouring (ART)	Yes 50% efficiency	> 4	No	25 to 100	0.0054	0.0054	Risk adequately controlled
	14 - Production of preparations or articles by tableting, compression, extrusion, pelletisation.	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	3.607	3.607	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled
	15 – use as a laboratory reagent	No	> 4	No	25 to 100	20.041	20.041	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	3.607	3.607	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.902	0.902	Risk adequately controlled
	19 - Hand-mixing with intimate contact and only PPE available (MEASE)	No	> 4	No	25 to 100	40.082	40.082	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	7.215	7.215	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	1.804	1.804	RMMs required to control risk



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19 - Hand-mixing with intimate contact and only PPE available (MEASE)	Yes 50% efficiency	> 4	No	25 to 100	0.0054	0.0054	Risk adequately controlled
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RCR, workers, Industrial activities, liquid phosphoric acid, aqueous solutions, >25%

Process Category (PROC)	LEV	Duration (hours)	PRE (% efficiency)	Content (% w/w)	Inhalation exposure (mg/m3)	RCR	Conclusion
1 - Use in closed process, no likelihood of exposure	No	> 4	No	25 to 100	0.001	0.001	Risk adequately controlled
2 – used in closed, continuous process with occasional controlled exposure	No	> 4	No	25 to 100	0.001	0.001	Risk adequately controlled
3 – use in closed batch process (synthesis or formulation)	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
4 – use in batch or other process (synthesis) where opportunity for exposure arises	No	> 4	No	25 to 100	0.05	0.05	Risk adequately controlled
5 – Mixing or blending in in batch processes for formulation of preparations and articles (multistage and/or significant contact)	No	> 4	No	25 to 100	0.05	0.05	Risk adequately controlled
7 - Industrial spraying.	No	> 4	No	25 to 100	20	20	RMMs required to control risk
	Yes medium efficiency	> 4	No	25 to 100	4.4	4.4	RMMs required to control risk
	Yes medium efficiency	> 4	75%	25 to 100	1.1	1.1	RMMs required to control risk
7 - Industrial spraying. (Modelled with ART, conditions as detailed in CSR)	Yes – primary: 90%	> 4	Secondary containment: LEV (50% efficiency)	25 to 100	0.55	0.55	Risk adequately controlled
8a -Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.	No	> 4	No	25 to 100	0.05	0.05	Risk adequately controlled
8b – transfer of chemicals from/to vessels/large containers	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled



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at dedicated facilities							controlled
9 – transfer of chemicals into small containers (dedicated filling line)	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
10: Roller application or brushing.	No	> 4	No	25 to 100	0.05	0.05	Risk adequately controlled
13: Treatment of articles by dipping and pouring	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
14: Production of preparations or articles by tableting, compression, extrusion, pelletisation.	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
15 – use as a laboratory reagent	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
19: Hand-mixing with intimate contact and only PPE available	No	> 4	No	25 to 100	0.05	0.05	Risk adequately controlled

RCR workers, Industrial activities, solid phosphoric acid, low dustiness, >25%

Process Category (PROC)	LEV	Duration (hours)	PRE (% efficiency)	Content (% w/w)	Inhalation exposure (mg/m3)	RCR	Conclusion
1 - Use in closed process, no likelihood of exposure	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
2 – used in closed, continuous process with occasional controlled exposure	No	> 4	No	25 to 100	0.01	0.01	Risk adequately controlled
3 – use in closed batch process (synthesis or formulation)	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
4 – use in batch or other process (synthesis) where opportunity for exposure arises	No	> 4	No	25 to 100	0.5	0.5	Risk adequately controlled
5 – Mixing or blending in in batch processes for formulation of preparations and articles (multistage and/or significant contact)	No	> 4	No	25 to 100	0.5	0.5	Risk adequately controlled



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	7 - Industrial spraying.	No	> 4	No	25 to 100	1	1	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	0.18	0.18	Risk adequately controlled
	8a -Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.	No	> 4	No	25 to 100	0.5	0.5	Risk adequately controlled
	8b – transfer of chemicals from/to vessels/large containers at dedicated facilities	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
	9 – transfer of chemicals into small containers (dedicated filling line)	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
	10: Roller application or brushing.	No	> 4	No	25 to 100	0.5	0.5	Risk adequately controlled
	13: Treatment of articles by dipping and pouring	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
	14: Production of preparations or articles by tableting, compression, extrusion, pelletisation.	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
	15 – use as a laboratory reagent	No	> 4	No	25 to 100	0.1	0.1	Risk adequately controlled
	19: Hand-mixing with intimate contact and only PPE available	No	> 4	No	25 to 100	0.5	0.5	Risk adequately controlled
	22: Potentially closed processing operations with minerals/metals at elevated temperature.	No	> 4	No	25 to 100	7	7	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	1.26	1.26	RMMs required to control risk
		Yes medium efficiency	> 4	75%	25 to 100	0.315	0.315	Risk adequately controlled
	23: Open processing and transfer operations with minerals/metals at elevated temperature.	No	> 4	No	25 to 100	2	2	RMMs required to control risk
		Yes medium efficiency	> 4	No	25 to 100	0.36	0.36	Risk adequately controlled

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Workers (dermal)	<p>Phosphoric acid is a corrosive substance. For the handling of corrosive substances and formulations immediate dermal contact mainly occurs accidentally (splashes, etc) as 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.</p> <p>Dermal exposure to > 25% phosphoric acid formulations is not quantitatively assessed as phosphoric acid is a very corrosive agent.</p>
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for orthophosphoric acid, as the substance can be effectively removed from the wastewater or neutralised. Thus, no assessment of indirect exposure of humans via the environment is performed.
Consumers	No direct consumer exposure is anticipated with the manufacture of orthophosphoric acid.
5.2. Environmental exposure (qualitative assessment)	
Environmental release	<p>The production of orthophosphoric acid can potentially result in aquatic emissions and locally increase the phosphate concentration while decreasing the pH in the aquatic environment.</p> <p>However, the pH of industrial effluents is normally measured frequently and can be neutralized easily.</p>
Waste water treatment plants (WWTP)	Not relevant. Orthophosphoric acid dissociates in H^+ and PO_4^{3-} and will be neutralised before reaching WWTP.
Aquatic pelagic compartment	The predominant adverse effects of orthophosphoric acid in aquatic systems are pH-related effects, as a result of the acidic nature of orthophosphoric acid. As phosphoric acid is a triprotic acid it will dissociate up to 3 times; releasing a phosphate anion ($H_2PO_4^-$, HPO_4^{2-} or PO_4^{3-}) 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 higher the buffering capacity of the water, the lower the effect on pH will be.
Sediments	Not relevant. Orthophosphoric acid will progressively dissociate in water to give H^+ and PO_4^{3-} 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.
Soil and groundwater	Not relevant. Orthophosphoric acid entering soil and ground water will be partially neutralised, dispersed and diluted. There will be no absorption of phosphoric acid on particulate matter or surfaces. The dissociation product of orthophosphoric acid, phosphate ions may absorb onto soil but will not result in toxicity as these are essential nutrients.
Atmospheric compartment	Not relevant. Orthophosphoric acid release is negligible, due to its low vapour pressure.
Secondary poisoning	Bioaccumulation in organisms is not relevant for orthophosphoric acid.

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ES3: Professional use of orthophosphoric acid

1. Short title of exposure scenario 3	
Professional use of orthophosphoric acid	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 1: Agriculture, forestry and fishing SU 19: Hand-mixing with intimate contact SU 22: Professional uses: public domain SU 24: Scientific research and development
Product category (PC)	PC 9a: Coatings and paints, thinners, paint removers PC 9b: Fillers, putties, plasters, modelling clay PC 12: Fertilisers PC 14: Metal surface treatment products, including galvanic and electroplating products PC 15: Non-metal-surface treatment products PC 21: Laboratory chemicals PC 31: Polishes and wax blends 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
Process category (PROC)	PROC 5: Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a: Transfer of chemicals 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 15: Use as a laboratory reagent PROC 19: Hand-mixing with intimate contact (only PPE available) PROC 25: Other hot work operations with metals
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8e: Wide dispersive outdoor use of reactive substances in open systems
3. Operational conditions	
3.1 Operational conditions related with frequency and quantities of use	
Duration of exposure at workplace:	Detergents and cleaning products: Phosphoric acid is used during the production phase of various cleaning products, although often the amount in the end products is limited due to its reactivity. The phosphoric acid that is used in professional formulation interacts with the other ingredients in the acid-base reactions. Therefore, free phosphoric acid left in the final product is limited.
Frequency of exposure at workplace:	The amount used per professional workers varies from activity to activity. The operational conditions related to the frequency, duration and amount of use taken from the exposure scenarios provided by the International Association for Soaps, Detergents and Maintenance Products (AISE 2009) describe professional uses of phosphoric acid where duration is shorter



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	<p>than 4h. For professional use of cleaning agents, the AISE exposure scenario gives a frequency of 80 applications per day and a duration of 0.1 minutes per application for spraying and a frequency of 8 applications per day and a duration of 60 minutes per application for brushing.</p> <p>No information on the concentration of phosphoric acid in the final products is available; therefore a worst-case approach will be taken. The concentration of solid phosphoric in detergent products is assumed to be >25% whereas the concentration in liquids products is assumed to be between 5 and 25%.</p> <p>Fertilizers: No information about the duration and frequency of tasks is available. In the first tier assessment a frequency of once per day with an exposure duration of >4 hours is considered as a worst case. No information on concentration is available; therefore a worst-case approach will be taken. The concentration of solid phosphoric in detergent products is assumed to be >25% whereas the concentration in liquids products is assumed to be between 5 and 25%.</p> <p>Construction and building applications: No information about the duration and frequency of tasks is available. In the first tier assessment a frequency of once per day with an exposure duration of >4 hours is considered as a worst case. No information on concentration is available; therefore a worst-case approach will be taken. The concentration of solid phosphoric in construction products is assumed to be >25% whereas the concentration in liquids products is assumed to be between 5 and 25%.</p> <p>Metal surface treatment and soldering flux: No information about the duration and frequency of tasks is available. In the first tier assessment a frequency of once per day with an exposure duration of >4 hours is considered as a worst case. No information on concentration is available; therefore a worst-case approach will be taken. The concentration of solid phosphoric in used in metal surface treatment is assumed to be >25%. The concentration in liquids products for metal surface treatment and soldering flux is assumed to be 5-25%.</p>
Annual amount used per site:	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure.
3.2 Operational conditions related with substance/ product	
Physical state	Solid / Liquid
Concentration of substance in mixture	See above.
3.3 Other relevant operational conditions	
The amount used per professional workers varies from activity to activity. The maximum duration >4 h/day was considered as worst case assumption.	
4. Risk Management Measures	
4.1 RMMs related to workers	
Organisational measures	Professional users should wear appropriate personal protection equipment, such as gloves and safety glasses during processes. The employer must ensure that the required PPE is



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	available and used according to instructions (provide training if necessary). Safety showers and eye washes are installed to be available in the case of accidental contact.
Technical measures	<ul style="list-style-type: none"> Use closed/ automated systems or covering of open containers (e.g. screens) to avoid irritating mists, sprayings and potential splashes. (Good practice) Store in cool, dry, clean, well ventilate areas. (Good practice).
Respiratory protection	Personal respiratory equipment (PRE): In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter.
Hand protection	Hand protection is required: Impervious chemical resistant protective gloves are required. Material of gloves. Chloroprene, Neoprene or PVC gloves
Eye protection	Wearing of eye/face protection is required as substance is corrosive. Goggles or face protection shield should be consistent with EN 166 or equivalent.
Skin and body protection	Wearing of suitable protective clothing and rubber boots is recommended.
Hygiene measures	Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work. Keep work clothes separate.

4.2 RMMs related to the environment

Organisational measures	Procedural and/or control technologies are required to minimise emissions and the resulting exposure during cleaning and maintenance procedures.
Abatement measures related to wastewater	Different rules apply to professional users regarding control of their effluents. It is required that the flow of release to municipal wastewater or to surface water do not cause significant in pH changes. It is then dependant whether or not discharging is done to municipal wastewater equipped with sewage treatment plant or not.
Abatement measures waste air and solid waste	Orthophosphoric acid is not expected to be found in the solid waste nor to reach the air compartment, due to its low vapour pressure. Therefore, no specific risk management measures for air emissions are provided. For release to soil for fertilizer uses, the pH will be naturally neutralized by the medium before reaching the groundwater.

4.3 Waste related measures

Type of waste	Liquid waste, solid residues, packaging material
Disposal technique	The release of phosphates to wastewater is highly regulated, In addition pH changes in receiving waters should be minimised. The residue of the containers or the used container itself should be disposed in accordance with local and national requirements. See Section 13 of the SDS for more information.
Fraction released to environment during waste treatment	Not determined. The pH of wastewater released from manufacturing sites should be between pH 6-9.

5. Prediction of exposure and comparison of predicted exposure with DNELs (Risk Characterisation)

5.1. Human exposure



ORTHOPHOSPHORIC ACID

EC number : 231-633-2
CAS number : 7664-38-2

Exposure scenarios

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Exposure estimation tool(s)	Workers, inhalation / dermal, TIER 1 (all uses): MEASE Workers, inhalation / dermal, TIER 2 (spray applications): UK POEM								
Workers (oral)	The professional uses of orthophosphoric acid will not notably contribute to the oral intake of phosphates.								
<p>Workers (inhalation)</p> <p><i>DNEL /OEL : Worker, long-term, inhalation: 1 mg/m³</i></p>	RCR, worker exposure to phosphoric acid from professional uses. – Tier 1								
	Process Category (PROC)	Location	LEV	Duration (hours)	PRE (% efficiency)	Content (% w/w)	Inhalation exposure (mg/m ³)	RCR	Conclusion
	H₃PO₄, liquid, low volatility								
	5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).	Indoors	No	> 4	No	5 to 25	24.049	24.049	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	5.411	5.411	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	90%	5 to 25	0.541	0.541	Risk adequately controlled
		Outdoors	Ventilation effect	> 4	No	5 to 25	17.135	17.135	RMMs required to control risk
		Outdoors	Ventilation effect	> 4	95%	5 to 25	0.857	0.857	Risk adequately controlled
	8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities. (MEASE)	Indoors	No	> 4	No	5 to 25	60.123	60.123	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	13.528	13.528	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	95%	5 to 25	0.676	0.676	Risk adequately controlled
		Outdoors	Ventilation effect	> 4	No	5 to 25	42.837	42.837	RMMs required to control risk
		Outdoors	Ventilation effect	> 4	95%	5 to 25	2.142	2.142	RMMs required to control risk
PROC 8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large	Outdoors	Ventilation effect	> 4	No	5 to 25	0.54	0.54	Risk adequately controlled	



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	containers at non-dedicated facilities. (ART)									
	8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.	Indoors	No	> 4	No	5 to 25	24.049	24.049	RMMs required to control risk	
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	5.411	5.411	RMMs required to control risk	
		Indoors	Yes Medium efficiency	> 4	90%	5 to 25	0.541	0.541	Risk adequately controlled	
		Outdoors	Ventilation effect	> 4	No	5 to 25	17.135	17.135	RMMs required to control risk	
		Outdoors	Ventilation effect	> 4	95%	5 to 25	0.857	0.857	Risk adequately controlled	
	9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing).	Indoors	No	> 4	No	5 to 25	24.049	24.049	RMMs required to control risk	
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	5.411	5.411	RMMs required to control risk	
		Indoors	Yes Medium efficiency	> 4	90%	5 to 25	0.541	0.541	Risk adequately controlled	
		Outdoors	Ventilation effect	> 4	No	5 to 25	17.135	17.135	RMMs required to control risk	
		Outdoors	Ventilation effect	> 4	95%	5 to 25	0.857	0.857	Risk adequately controlled	
10 - Roller application or brushing. (MEASE)	Indoors	No	> 4	No	5 to 25	60.123	60.123	RMMs required to control risk		
	Indoors	Yes Medium efficiency	> 4	No	5 to 25	13.528	13.528	RMMs required to control risk		
	Indoors	Yes Medium efficiency	> 4	95%	5 to 25	0.676	0.676	Risk adequately controlled		
	Outdoors	Ventilation effect	> 4	No	5 to 25	42.837	42.837	RMMs required to control risk		
	Outdoors	Ventilation effect	> 4	95%	5 to 25	2.142	2.142	RMMs required to control risk		



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									control risk
	10 - Roller application or brushing. (ART)	Outdoors	Ventilation effect	> 4	No	5 to 25	0.59	0.59	Risk adequately controlled
	11 - Non industrial spraying.	Indoors	No	> 4	No	5 to 25	240.491	240.491	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	54.11	54.11	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	95%	5 to 25	2.709	2.709	RMMs required to control risk
		Outdoors	Ventilation effect	> 4	No	5 to 25	171.35	171.35	RMMs required to control risk
		Outdoors	Ventilation effect	> 4	95%	5 to 25	8.567	8.567	RMMs required to control risk
	13 - Treatment of articles by dipping and pouring.	Indoors	No	> 4	No	5 to 25	24.049	24.049	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	5.411	5.411	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	90%	5 to 25	0.541	0.541	Risk adequately controlled
		Outdoors	Ventilation effect	> 4	No	5 to 25	17.135	17.135	RMMs required to control risk
		Outdoors	Ventilation effect	> 4	95%	5 to 25	0.857	0.857	Risk adequately controlled
	15 – Use as a laboratory reagent	Indoors	No	> 4	No	5 to 25	12.025	12.025	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	No	5 to 25	2.706	2.706	RMMs required to control risk
		Indoors	Yes Medium efficiency	> 4	95%	5 to 25	0.676	0.676	Risk adequately controlled
	19 - Hand-mixing with intimate contact and only PPE available.	Indoors	No	> 4	No	5 to 25	0.3	0.3	Risk adequately controlled
		Outdoors	Ventilation effect	> 4	No	5 to 25	0.3	0.3	Risk adequately controlled



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Exposure scenarios

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controlled

Tier 2 exposure assessment and RCR, professional worker exposure to phosphoric acid from spraying applications

	Tractor-mounted/trailed boom sprayer: hydraulic nozzles	Tractor-mounted/trailed boom sprayer: rotary atomisers	Tractor-mounted/trailed broadcast air-assisted sprayer: 500 L/ha	Hand-held sprayer (15 L tank): hydraulic nozzles. Outdoor, low level target	Hand-held rotary atomiser equipment (2.5 L tank). Outdoor, low level target	Hand-held rotary atomiser equipment (2.5 L tank). Outdoor, high level target	Unit
Spray Application							
Long-term exposure concentration of a.s.	0.06	0.03	0.3	0.12	0.06	0.06	mg/m ³
RCR	0.06	0.03	0.3	0.12	0.06	0.06	
Conclusion	Risk adequately controlled for all spray applications.						

Workers (dermal) No systemic toxicity effects are expected due to the inorganic nature of the substance however local effects may occur but these effects will not be dose-dependent but will depend on the concentration of the substance present in the mixture/solution used in a specific application. It is therefore recommended that the appropriate PPE is used.

Indirect exposure via the environment No indirect exposure of humans via the environment is expected for orthophosphoric acid. Thus, no assessment of indirect exposure of humans via the environment is required.

Consumers

5.2. Environmental exposure (qualitative assessment)


Environmental release The production of orthophosphoric acid can potentially result in aquatic emissions and locally increase the phosphate concentration while decreasing the pH in the aquatic environment. However, the pH of industrial effluents is normally measured frequently and can be neutralized easily.

Waste water treatment plants (WWTP) Not relevant. Orthophosphoric acid dissociates in H⁺ and PO₄³⁻ and will be neutralised before reaching WWTP.

Aquatic pelagic compartment The predominant adverse effects of orthophosphoric acid in aquatic systems are pH-related effects, as a result of the acidic nature of orthophosphoric 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 higher the buffering capacity of the water, the lower the effect on pH will be.

Sediments Not relevant. Orthophosphoric 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.

Soil and groundwater Not relevant. Orthophosphoric acid entering soil and ground water will be partially neutralised, dispersed and diluted. There will be no absorption of phosphoric acid on particulate matter or surfaces. The dissociation product of orthophosphoric acid, phosphate ions may absorb onto soil but will not result in toxicity as these are essential

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	nutrients.
Atmospheric compartment	Not relevant. Orthophosphoric acid release is negligible, due to its low vapour pressure.
Secondary poisoning	Bioaccumulation in organisms is not relevant for orthophosphoric acid.

ES4: Consumer use of orthophosphoric acid

1. Short title of exposure scenario 4	
Consumer use of orthophosphoric acid	
2. Description of activities and processes covered in the exposure scenario	
Sector of use (SU)	SU 21:
Product category (PC)	PC 12: Fertilisers PC 31: Polishes and wax blends PC 35: Washing and cleaning products (including solvent based products) PC 38: Welding and soldering products (with flux coatings or flux cores)., flux products PC 39: Cosmetics, personal care products
Process category (PROC)	Not applicable
Article category (AC)	Not applicable
Environmental release category (ERC)	ERC 8a: Wide dispersive indoor use of processing aids in open systems ERC 8b: Wide dispersive indoor use of reactive substances in open systems ERC 8d: Wide dispersive outdoor use of processing aids in open systems ERC 8e: Wide dispersive outdoor use of reactive substances in open systems
3. Operational conditions	

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3.1 Operational conditions related with frequency and quantities of use

Phosphoric acid is typically present in consumer products in low concentrations. The main uses are listed below and included in this exposure scenario.

- Use in polishes and waxes: use of polishes in spray, and waxes/cream for floor, furniture, shoes, where phosphoric acid is co-formulant
- Use as washing and cleaning agent: use of household washing and cleaning products containing phosphoric acid to remove mineral deposits and hard water stains (lime scale removers, typical concentration of phosphoric acid in the product: 5-15%)
- Use of household fertilizers containing phosphoric acid: use of liquid and soluble liquid or solid fertilizers. It includes transfer, loading, unloading, dilution operations and surface spreading of minor quantities for indoor/ outdoor home fertilizer use.
- Use phosphoric acid in batteries: electrolyte system, fuel cells and other closed systems.
- Use as additive in cosmetics and use as a food additive. These applications are not included in this exposure scenario as food/ feed applications are covered under Regulation (EC) N°1935/2004 and cosmetics under Directive 76/768/CEE.

Phosphoric acid is not provided as such to consumers and general public. In addition, this scenario does not cover phosphoric acid present in consumer products at a concentration of >25%.

3.2 Operational conditions related with substance/ product

Physical state	Solid / Liquid
Concentration of substance in mixture	See above.

4. Risk Management Measures**4.1 RMMs related to Consumers**

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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.

Measures related to the design of the product

- It is required to use acid resistant labelling and packaging in order to avoid auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.
- It is required that household chemicals, containing phosphoric acid at $\geq 10\%$ 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.
- 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.

PPE required under regular conditions of consumer use

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.

4.2 RMMS related to the environment

There are no specific risk management measures related to environment.

Abatement measures related to wastewater

No specific abatement measures recommended.

Abatement measures waste air and solid waste

No specific abatement measures recommended.

4.3 Waste related measures

It is anticipated that empty containers will end up in the municipal waste.

Batteries: this material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). It is not anticipated that consumers will be exposed to phosphoric acid in batteries.

5. Prediction of exposure and comparison of predicted exposure with DNELs (Risk Characterisation)**5.1. Human exposure**



ORTHOPHOSPHORIC ACID

EC number : 231-633-2
CAS number : 7664-38-2

Exposure scenarios

Réf: version2_Feb2012

Exposure estimation tool(s)	Consumers, inhalation, TIER 2 (spray applications, fertilisers): UK POEM Consumers, inhalation, TIER 2 (spray applications, fertilisers): ConsExpo																
Consumer (oral)	The consumer uses of orthophosphoric acid will not notably contribute to the oral intake of phosphates.																
<p>Consumers (inhalation)</p> <p><i>DNEL</i> <i>:General population, long-term, inhalation:</i> <i>0.73 mg/m³</i></p>	<p>The consumer exposure assessment will consider a worst-case approach (i.e. uses that are likely to result in the highest exposure). The uses to be assessed are:</p> <ul style="list-style-type: none"> - Use in lime scale removers; phosphoric acid present at concentrations of 5-15%. - Consumer spray applications of fertilisers (max concentration of phosphoric acid: 10%). <p>All other consumer uses are considered to be safe if the above uses give an RCR of <1. On the basis that the above scenarios represent a worst-case for inhalation exposure.</p> <p>Consumer exposure to phosphoric acid resulting from the spray application of liquid fertilizers was predicted using the UK POEM model (UK HSE). The duration of spraying was considered to be 30 minutes/day. The inhalation volume of the consumer was considered to be 26 m³/day, the body weight used in the model was 60 kg. No inhalation is expected during the mixing and loading of liquid fertilisers.</p> <p>Inhalation exposure to phosphoric acid in lime scale remover applications (phosphoric acid present in the formulation at ≤15%) was estimated using the Cons Expo software (RIVM., 2006). The product was selected as default product: cleaning and washing product (application liquid), and the types of product bathroom cleaning agent and toilet cleaner were assessed (The Soap and Detergent Association (SDA) states that 'phosphoric acid can dissolve calcium and metal salts; they find use in tub, tile, sink and toilet bowl cleaners') in order to ascertain the worst case in terms of exposure to phosphoric acid in lime scale removal and cleaning applications.</p> <p>Default parameters of the model were used to characterise the use conditions (frequency: 4 times a year for bathroom cleaners, 260 times a year for toilet cleaners as discussed in the Cleaning Products Fact Sheet, RIVM report 320104003). The following product information was used: 15% of phosphoric acid, duration of 20 minutes; 110g product/application</p> <p>Exposure assessment and RCR, consumer exposure to phosphoric acid (spray applications and toilet clear / lime scale removal applications)</p> <table border="1" data-bbox="360 1552 1449 1993"> <thead> <tr> <th>Consumer use</th> <th>Inhalation exposure estimate (mg/m³)</th> <th>RCR</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td>Private spraying of liquid fertiliser (phosphoric acid concentration up to 10%)</td> <td>0.01</td> <td>0.014</td> <td>Risk adequately controlled</td> </tr> <tr> <td>Use of liquid bathroom cleaners (phosphoric acid concentration up to 15%)</td> <td>0.0687</td> <td>0.094</td> <td>Risk adequately controlled</td> </tr> <tr> <td>Use of toilet cleaners (phosphoric acid concentration up to 15%) w/w)</td> <td>0.085</td> <td>0.116</td> <td>Risk adequately controlled</td> </tr> </tbody> </table>	Consumer use	Inhalation exposure estimate (mg/m ³)	RCR	Conclusion	Private spraying of liquid fertiliser (phosphoric acid concentration up to 10%)	0.01	0.014	Risk adequately controlled	Use of liquid bathroom cleaners (phosphoric acid concentration up to 15%)	0.0687	0.094	Risk adequately controlled	Use of toilet cleaners (phosphoric acid concentration up to 15%) w/w)	0.085	0.116	Risk adequately controlled
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Exposure scenarios

Réf: version2_Feb2012

Consumers (dermal)	Local effects of phosphoric acid can be managed by using the recommended PPE.
Indirect exposure via the environment	No indirect exposure of humans via the environment is expected for orthophosphoric acid Thus, no assessment of indirect exposure of humans via the environment is required.
5.2. Environmental exposure (qualitative assessment)	
<p>Consumer uses relates to already diluted products, which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.</p> <p>Orthophosphoric acid used in batteries: there is no environmental release as batteries are sealed articles with a long service life. After use, batteries should be recycled.</p> <p>If disposed as municipal waste, orthophosphoric acid is not expected to cause a significant pH effect to the environment when incinerated or land filled.</p>	