

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	: Substance
Trade name	: SULPHURIC ACID
Chemical name	: sulphuric acid
EC index no	: 016-020-00-8
EC no	: 231-639-5
CAS No	: 7664-93-9
REACH registration No	: 01-2119458838-20-0010
Product code	: A01486-A01487-A01488 en A02534
Formula	: H ₂ SO ₄
Synonyms	: Hydrogen sulphate
Product group	: acid

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Title	Use descriptors
Industrial use resulting in manufacture of another substance (use of intermediates) - Sulfuric acid (ES Ref.: SE2)	SU3, SU4, SU6b, SU8, SU9, SU14, PC19, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, ERC6a
Industrial use of reactive processing aids, Catalyst, PH-regulator, Dehydrating agent (ES Ref.: SE3)	SU3, SU4, SU5, SU6b, SU8, SU9, SU11, SU23, PC20, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13, ERC6b
Extractions and processing of minerals and ores - Sulfuric acid (ES Ref.: SE4)	SU2a, SU3, SU14, PC20, PC40, PROC2, PROC3, PROC4, ERC4, ERC6b
surface treatment industry. - Sulfuric acid (ES Ref.: SE5)	SU2a, SU3, SU14, SU15, SU16, PC14, PC15, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13, ERC6b
Electrolytical processes - Sulfuric acid (ES Ref.: SE6)	SU3, SU14, SU15, SU17, PC14, PC20, PROC1, PROC2, PROC8b, PROC9, PROC13, ERC5, ERC6b
Gas purification, scrubbing, flue gas scrubbing - Sulfuric acid (ES Ref.: SE7)	SU3, SU8, PC20, PROC1, PROC2, PROC8b, ERC7
Production of lead acid batteries - Sulfuric acid (ES Ref.: SE8)	SU3, PC0, PROC2, PROC3, PROC4, PROC9, ERC2, ERC5
Industrial cleaner - Sulfuric acid (ES Ref.: SE12)	SU3, PC35, PROC2, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, ERC8a, ERC8b
Formulation [mixing] of preparations and/or re-packaging (excluding alloys) - Sulfuric acid (ES Ref.: SE13)	SU3, SU10, PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9, ERC2
Battery maintenance - Sulfuric acid (ES Ref.: SE9)	SU22, PC0, PROC19, ERC8b, ERC9b
Recycling of lead acid batteries - Sulfuric acid (ES Ref.: SE10)	SU3, PC0, PROC2, PROC4, PROC5, PROC8a, ERC1
Laboratory chemicals - Sulfuric acid (ES Ref.: SE11)	SU22, PC21, PROC15, ERC8a, ERC8b

Full text of use descriptors: see section 16

1.2.2. Uses advised against

Title	Use descriptors	Reason
sulphuric acid	SU21	

Full text of use descriptors: see section 16

1.3. Details of the supplier of the safety data sheet

Indufarm N.V..
 Leon Bekaertstraat 5
 B-8770 Ingelmunster - Belgique-Belgium
 T +32 (0)51 62 42 45 -
info@indufarm.com - www.indufarm.com

1.4. Emergency telephone number

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Country	Organisation/Company	Address	Emergency number	Comment
	National Poisons Information Service (Belfast Centre) Royal Victoria Hospital	Grosvenor Road BT 12 6BA Belfast	0870 600 6266 (UK only),	
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital, Guy's & St Thomas' Hospital Trust	Dudley Road B18 7QH Birmingham	0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)	
United Kingdom	National Poisons Information Service (Cardiff Centre) Gwenwyn Ward, Wolfson Unit	Penarth CF64 2XX Cardiff	0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)	
United Kingdom	NPIS Edinburgh (Scottish Poisons Information Bureau) Royal Infirmary of Edinburgh, Centre Hospitalier Universitaire Bab el Oued	51 Little France Crescent EH16 4SA Edinburgh	0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)	
United Kingdom	Guy's & St Thomas' Poisons Unit Medical Toxicology Unit, Centre Hospitalier Universitaire de Constantine	Avonley Road SE14 5ER London	0870 243 2241	
United Kingdom	National Poisons Information Service (Newcastle Centre) Regional Drugs and Therapeutics Centre	Claremont Place Newcastle-upon-Tyne NE1 4LP Newcastle	0844 892 0111 (UK only, Monday to Friday, 08.00 to 18.00 hours)	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin corrosion/irritation, H314
Category 1A

Full text of H-statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS05

Signal word (CLP) :

Danger

Hazard statements (CLP) :

H314 - Causes severe skin burns and eye damage

Precautionary statements (CLP) :

P260 - Do not breathe spray, mist, fume, gas, dust, vapours
P280 - Wear protective gloves, protective clothing, eye protection, face shield
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P363 - Wash contaminated clothing before reuse

2.3. Other hazards

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

SECTION 3: Composition/information on ingredients

3.1. Substance

Name : SULPHURIC ACID
CAS No : 7664-93-9
EC no : 231-639-5
EC index no : 016-020-00-8

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Sulfuric acid	(CAS No) 7664-93-9 (EC no) 231-639-5 (EC index no) 016-020-00-8 (REACH-no) 01-2119458838-20-0010	95 - 99	Skin Corr. 1A, H314

Full text of H-statements: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Call a physician immediately. Assure fresh air breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Allow the victim to rest. If breathing stops, perform cardio pulmonary resuscitation (CPR). Mouth-to-mouth resuscitation is forbidden (possible poisoning of first-aiders). Place the victim in the recovery position. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- First-aid measures after skin contact : Obtain medical attention. In case of skin contact, immediately wash with suitable product and rinse with plenty of water (20-30 min). Remove contaminated clothing and shoes. Chemical burns must be treated promptly by a physician.
- First-aid measures after eye contact : With eyelid retractor, rinse thoroughly with water during 20-30 minutes. Seek medical attention immediately.
- First-aid measures after ingestion : Seek medical attention immediately. If swallowed, rinse mouth with water (only if the person is conscious). Do not induce vomiting. Give nothing to drink.

4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries after inhalation : Burns of respiratory tract. Death in extreme cases.
- Symptoms/injuries after skin contact : Causes burns. May cause severe irreversible damage.
- Symptoms/injuries after eye contact : Causes serious eye damage. Can cause blindness.
- Symptoms/injuries after ingestion : Abdominal pain. Nausea. May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Death in extreme cases.

4.3. Indication of any immediate medical attention and special treatment needed

See Heading 4.1.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray. CO₂. Powders. Foam.
- Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Non combustible. On heating: release of toxic and corrosive gases/vapours sulphur oxides.

5.3. Advice for firefighters

- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Use water stream to cool containers. Use an autonomous respiratory protection.
- Other information : Exercise caution when fighting any chemical fire. Wear acid-resistant protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Spill should be handled by trained cleaning personnel properly equipped with respiratory and eye protection. Evacuate and limit access. Avoid any direct contact with the product. Personal protective equipment (see section (s) :8.2). Avoid breathing mist, vapours and spray.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Knock down vapour cloud with water spray or other appropriate solution. Notify authorities if product enters sewers or public waters. Prevent entry to sewers and public waters.

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6.3. Methods and material for containment and cleaning up

Methods for cleaning up : If safety allows : Stop or confine leakage. Well-ventilated area. Clean up any spills as soon as possible, using an absorbent material to collect it. Neutralize with sodium carbonate, calcium carbonate, or lime. Use non-corrodable disposal containers. Rinse with plenty of water. Dispose of this material and its container at hazardous or special waste collection point.

6.4. Reference to other sections

See section 8 and 13 for more information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear suitable protective clothing and gloves. (see section(s) :8). Avoid any direct contact with the product. Do not breathe gas, fumes, vapour or spray. Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. Avoid all unnecessary exposure. Keep away from : alkalis. Splatters.

Hygiene measures : When using do not eat, drink or smoke. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in accordance with local regulations. Keep only in the original container in a cool, well ventilated place away from : Direct sunlight. Incompatible materials. alkalis. Keep away from food, drink and animal feeding stuffs. Keep packaging closed when not in use. Store closed containers with closure in upper position. Fill only into labelled container. Preferred storage containers included stainless steel or certain reinforced plastics. Use appropriate container to avoid environmental contamination. Containers or packaging, even those that have been emptied, will retain product residue. Always obey safety warnings and handle empty containers as if they were full. Do not use air pressure to empty containers.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

SULPHURIC ACID (7664-93-9)		
EU	IOELV TWA (mg/m ³)	0.05 mg/m ³
EU	IOELV STEL (mg/m ³)	0.1 mg/m ³
Sulfuric acid (7664-93-9)		
EU	IOELV TWA (mg/m ³)	0.05 mg/m ³
EU	IOELV STEL (mg/m ³)	0.1 mg/m ³

SULPHURIC ACID (7664-93-9)	
DNEL/DMEL (Workers)	
Acute - local effects, inhalation	0.1 mg/m ³
Long-term - local effects, inhalation	0.05 mg/m ³
PNEC (Water)	
PNEC aqua (freshwater)	0.0025 mg/l
PNEC aqua (marine water)	0.00025 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	0.002 mg/kg dwt
PNEC sediment (marine water)	0.002 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	8.8 mg/l

8.2. Exposure controls

Appropriate engineering controls : Where mist, vapours and spray may result. Local exhaust ventilation with captor/receptor hood. Use in closed process (for example in close loop system). Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Please refer to the annex (exposure scenarios).

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Hand protection	: Use gloves resistant to chemical products corresponding to EN 374:3". Take advice to gloves' manufacturer ."
Eye protection	: Chemical goggles or face shield with safety glasses
Skin and body protection	: Wear acid resistant protective clothings according EN ISO 17491-3 : 2008. Boots
Respiratory protection	: Where excessive mist may result, wear fullface mask with cartridge ABEK and P3 (EN 141) or an autonomous respiratory protection and respect suppliers' instructions
Environmental exposure controls	: Avoid release to the environment. Wastewater should be fully neutralized. Waste gas emissions must be scrubbed.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Oily liquid
Molecular mass	: 98.1 g/mol
Colour	: colourless to slightly yellow.
Odour	: odourless.
Odour threshold	: Not applicable
pH	: 0
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: No data available
Freezing point	: -22,2 (95%) / -1,1 (98%)
Boiling point	: 302 (95%) / 334(98%)
Flash point	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: 1,8337 (95%) / 1,8361 (98%)
Solubility	: May release heat. Water: 100 %
Log Pow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: (95%) / (98%)
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts with metals, sulfides, carbides and cyanides. Reacts violently with : Organic compounds. Reducing agents. Bases. Alkali. Water. Contact with metals produces hydrogen which may form explosive mixtures with air. May release heat and harmful fumes.

10.2. Chemical stability

Stable under normal conditions (Handling and storage).

10.3. Possibility of hazardous reactions

Refer to section 10.1 on Reactivity.

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Metals. Cyanides. Strong reducing agents. Bases. Combustibles. Water. Sulfides.

10.6. Hazardous decomposition products

Sulphur dioxide. Contact with metallic substances may release flammable hydrogen gas.

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Corrosive to eyes and skin

SULPHURIC ACID (7664-93-9)	
LD50 oral rat	2140 mg/kg Similar to:OECD 401
LC50 inhalation rat (mg/l)	375 mg/m ³ (4 Hours - Similar to:OECD 403)

Skin corrosion/irritation : skin corrosion/irritation Category 1A
pH: 0

Serious eye damage/irritation : Corrosive to eyes. Category 1
pH: 0

Respiratory or skin sensitisation : No

Germ cell mutagenicity : Negative. Similar to: OECD 471, Ames test

Carcinogenicity : No carcinogenic effect

Reproductive toxicity : Reproductive toxicity Not classified

Specific target organ toxicity (single exposure) : Not classified

SULPHURIC ACID (7664-93-9)	
NOAEL (oral, rat)	0.3 mg/kg bodyweight OECD 412

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

SULPHURIC ACID (7664-93-9)	
LC50 fish 1	16 mg/l (96h- <i>Lepomis macrochirus</i>)
EC50 Daphnia 1	> 100 mg/l (48h - <i>Daphnia magna</i> , OECD 202)
NOEC chronic fish	0.025 mg/l (<i>Salvelinus fontinalis</i>)
NOEC chronic crustacea	0.15 mg/l (<i>Tanytarsus dissimilis</i>)
NOEC chronic algae	100 mg/l (72h - <i>Desmodesmus subspicatus</i> , OECD 201)
NOEC (additional information)	NOEC 26000 mg/l -ACTIVATED SLUDGE

12.2. Persistence and degradability

SULPHURIC ACID (7664-93-9)	
Persistence and degradability	Not relevant. (inorganic substance).

12.3. Bioaccumulative potential

SULPHURIC ACID (7664-93-9)	
Bioaccumulative potential	No data available.

12.4. Mobility in soil

SULPHURIC ACID (7664-93-9)	
Ecology - soil	No data available.

12.5. Results of PBT and vPvB assessment

SULPHURIC ACID (7664-93-9)	
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII	
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII	

12.6. Other adverse effects

Other adverse effects : Harmful to aquatic organisms (pH modification).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Neutralize with :sodium carbonate, Calcium carbonate, Lime. Dispose in a safe manner in accordance with local/national regulations.

Additional information : Storage containers must be free of contamination before use. Dispose in a safe manner in accordance with local/national regulations. When totally empty, containers are recyclable like any other packing.

Ecology - waste materials : See the european waste catalogue.

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SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR)	: 1830
UN-No. (IMDG)	: 1830
UN-No. (IATA)	: 1830
UN-No. (ADN)	: 1830
UN-No. (RID)	: 1830

14.2. UN proper shipping name

Proper Shipping Name (ADR)	: SULPHURIC ACID
Proper Shipping Name (IMDG)	: SULPHURIC ACID
Proper Shipping Name (IATA)	: SULPHURIC ACID
Proper Shipping Name (ADN)	: SULPHURIC ACID
Proper Shipping Name (RID)	: SULPHURIC ACID
Transport document description (ADR)	: UN 1830 SULPHURIC ACID (UN 1830, SULPHURIC ACID, 8, II, (E)), 8, II, (E)
Transport document description (IMDG)	: UN 1830 SULPHURIC ACID, 8, II
Transport document description (IATA)	: UN 1830 SULPHURIC ACID, 8, II
Transport document description (ADN)	: UN 1830 SULPHURIC ACID, 8, II
Transport document description (RID)	: UN 1830 SULPHURIC ACID, 8, II

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR)	: 8
Danger labels (ADR)	: 8



IMDG

Transport hazard class(es) (IMDG)	: 8
Danger labels (IMDG)	: 8



IATA

Transport hazard class(es) (IATA)	: 8
Hazard labels (IATA)	: 8



ADN

Transport hazard class(es) (ADN)	: 8
Danger labels (ADN)	: 8



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RID

Transport hazard class(es) (RID) : 8
Danger labels (RID) : 8



14.4. Packing group

Packing group (ADR) : II
Packing group (IMDG) : II
Packing group (IATA) : II
Packing group (ADN) : II
Packing group (RID) : II

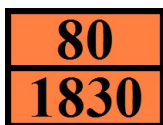
14.5. Environmental hazards

Dangerous for the environment : No
Marine pollutant : No
Other information : No

14.6. Special precautions for user

- Overland transport

Classification code (ADR) : C1
Limited quantities (ADR) : 1I
Excepted quantities (ADR) : E2
Hazard identification number (Kemler No.) : 80
Orange plates :



Tunnel restriction code (ADR) : E

- Transport by sea

Limited quantities (IMDG) : 1 L
MFAG-No : 137

- Air transport

PCA limited quantity max net quantity (IATA) : 0.5L

- Inland waterway transport

Classification code (ADN) : C1
Limited quantities (ADN) : 1 L

- Rail transport

Classification code (RID) : C1
Limited quantities (RID) : 1L

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
SULPHURIC ACID is not on the REACH Candidate List
SULPHURIC ACID is not on the REACH Annex XIV List

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Other information, restriction and prohibition regulations : REGULATION (EU) No 98/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 January 2013 on the marketing and use of explosives precursors - The substance is listed.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

A chemical safety assessment has been carried out

SECTION 16: Other information

Indication of changes:

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830.

Abbreviations and acronyms:

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

Data sources : Reach dossier.

Training advice : None.

Full text of H- and EUH-statements:

Skin Corr. 1A	Skin corrosion/irritation, Category 1A
H314	Causes severe skin burns and eye damage
ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC7	Industrial use of substances in closed systems
ERC8a	Wide dispersive indoor use of processing aids in open systems
ERC8b	Wide dispersive indoor use of reactive substances in open systems
ERC9b	Wide dispersive outdoor use of substances in closed systems
PC0	ARTICLES, PYROTECHNIC
PC14	Metal surface treatment products, including galvanic and electroplating products
PC15	Non-metal-surface treatment products

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PC19	Intermediate
PC20	Products such as ph-regulators, flocculants, precipitants, neutralization agents
PC21	Laboratory chemicals
PC35	Washing and cleaning products (including solvent based products)
PC40	Extraction agents
PROC1	Use in closed process, no likelihood of exposure
PROC10	Roller application or brushing
PROC13	Treatment of articles by dipping and pouring
PROC15	Use as laboratory reagent
PROC19	Hand-mixing with intimate contact and only PPE available
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
SU10	Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU11	Manufacture of rubber products
SU14	Manufacture of basic metals, including alloys
SU15	Manufacture of fabricated metal products, except machinery and equipment
SU16	Manufacture of computer, electronic and optical products, electrical equipment
SU17	General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
SU21	Consumer uses: Private households (= general public = consumers)
SU22	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
SU23	Electricity, steam, gas water supply and sewage treatment
SU2a	Mining, (including offshore industries)
SU3	Industrial uses: Uses of substances as such or in preparations* at industrial sites
SU4	Manufacture of food products
SU5	Manufacture of textiles, leather, fur
SU6b	Manufacture of pulp, paper and paper products
SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
SU9	Manufacture of fine chemicals

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. DISCLAIMER OF LIABILITY The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

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Annex to the Safety Data Sheet

Product exposure scenario(s)

ES Type	ES title
Worker	Industrial use resulting in manufacture of another substance (use of intermediates) - Sulfuric acid
Worker	Industrial use of reactive processing aids, Catalyst, PH-regulator, Dehydrating agent - Sulfuric acid
Worker	Extractions and processing of minerals and ores
Worker	surface treatment industry. - Sulfuric acid
Worker	Electrolytical processes - Sulfuric acid
Worker	Gas purification, scrubbing, flue gas scrubbing - Sulfuric acid
Worker	Production of lead acid batteries - Sulfuric acid
Worker	Battery maintenance - Sulfuric acid
Worker	Recycling of lead acid batteries - Sulfuric acid
Worker	Laboratory chemicals - Sulfuric acid
Worker	Industrial cleaner - Sulfuric acid
Worker	Formulation [mixing] of preparations and/or re-packaging (excluding alloys) - Sulfuric acid

1. Exposure scenario SE2

Industrial use resulting in manufacture of another substance (use of intermediates) - Sulfuric acid

ES Ref.: SE2
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3, SU4, SU6b, SU8, SU9, SU14 PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 PC19 ERC6a
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50 °C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment

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Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Without LEV;Vapour recovery system;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Complete segregation with ventilation and filtration of recirculated air	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

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according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.4 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Dedicated facility	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face

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		shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.5 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;Concentration: 98 %;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.6 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 98 %;With LEV;Vapour recovery system)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection

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Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	equipment
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.7 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2 Contributing scenario controlling environmental exposure (ERC6a)

ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	300000
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Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	94.9 kg/day
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Dedicated facility	
	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0	0.0000009	0	0.0000018	Acute: ART tool Long term: ART tool
PROC2 (Duration: 8 Hours, Without LEV, Vapour recovery system, Concentration: 98 %)	0.00000009	0.00000092	0.00000009	0.0000018	Acute: ART tool Long term: ART tool
PROC3 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0.00042	0.004	0.00042	0.008	Acute: ART tool Long term: ART tool
PROC4 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.014	0.14	0.014	0.28	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8 Hours, Concentration: 98 %, Without LEV)	0.023	0.23	0.023	0.46	Acute: ART tool Long term: ART tool
PROC8b	0.00012	0.001	0.0000048	0.0000	Acute: ART tool

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(Duration: 8 Hours, Concentration: 98 %, With LEV, Vapour recovery system)				96	Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.0032	0.032	0.0028	0.056	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00088	0.0025	0.352	Used EUSES model
Marine water	mg/l	0.00012	0.00025	0.48	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00073	0.002	0.365	Used EUSES model
Marine water sediment	mg/kg dwt	0.000103	0.002	0.052	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE3

Industrial use of reactive processing aids, Catalyst, PH-regulator, Dehydrating agent - Sulfuric acid

ES Ref.: SE3
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3, SU4, SU5, SU6b, SU8, SU9, SU11, SU23 PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13 PC20 ERC6b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Without LEV;Vapour recovery system;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %

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Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Workers are in a separate control room	
	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case

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		of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.4 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Dedicated facility	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.5 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;Concentration: 98 %;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

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Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.6 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 98 %;With LEV;Vapour recovery system)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.7 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

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Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.8 Contributing scenario controlling worker exposure (PROC13) (Duration: 8 Hours;Concentration: 98 %;Without LEV)

PROC13	Treatment of articles by dipping and pouring	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves

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	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2 Contributing scenario controlling environmental exposure (ERC6b)

ERC6b	Industrial use of reactive processing aids
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 100000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	333 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
	Dedicated facility	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0	0.0000009	0	0.0000007	Acute: ART tool Long term: ART tool
PROC2 (Duration: 8 Hours, Without LEV, Vapour recovery system, Concentration: 98 %)	0.0000009	0.0000092	0.0000009	0.0000018	Acute: ART tool Long term: ART tool
PROC3	0.00042	0.004	0.00042	0.008	Acute: ART tool

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(Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)					Long term: ART tool
PROC4 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.014	0.14	0.014	0.28	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8 Hours, Concentration: 98 %, Without LEV)	0.023	0.23	0.023	0.46	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours, Concentration: 98 %, With LEV, Vapour recovery system)	0.00012	0.001	0.0000048	0.000096	Acute: ART tool Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.0032	0.032	0.0028	0.056	Acute: ART tool Long term: ART tool
PROC13 (Duration: 8 Hours, Concentration: 98 %, Without LEV)	0.018	0.18	0.016	0.32	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000059	0.0025	0.002	Used EUSES model
Marine water	mg/l	0.00000085	0.00025	0.003	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00000475	0.002	0.002	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000069	0.002	0.000	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE4

Extractions and processing of minerals and ores

ES Ref.: SE4
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU2a, SU3, SU14 PROC2, PROC3, PROC4 PC20, PC40 ERC4, ERC6b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours; Without LEV; Vapour recovery system; Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 480 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment (EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.2 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours; With LEV; Vapour recovery system; Concentration: 98 %)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %

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Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 480 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 480 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in semi-automated and predominantly enclosed filling lines	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face

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		shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.2.1 Contributing scenario controlling environmental exposure (ERC4)

ERC4	Industrial use of processing aids in processes and products, not becoming part of articles	
Assessment method	Used EUSES model	

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	480
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	1.14 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
	Dedicated facility	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC6b)

ERC6b	Industrial use of reactive processing aids	
Assessment method	Used EUSES model	

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	480
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	1.14 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
	Dedicated facility	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment	Onsite wastewater treatment required	

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plant	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use,Special connecting systems are in place to reduce the levels of gaseous emissions,All pipes, transfers lines and reactor are closed and sealed,Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required,Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems,Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC2 (Duration: 8 Hours,Without LEV,Vapour recovery system,Concentration: 98 %)	0.00000009	0.00000092	0.00000009	0.0000018	Acute: ART tool Long term: ART tool
PROC3 (Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)	0.00042	0.004	0.00042	0.008	Acute: ART tool Long term: ART tool
PROC4 (Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)	0.014	0.14	0.014	0.28	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.000025	0.0025	0.01	Used EUSES model
Marine water	mg/l	0.0000036	0.00025	0.014	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00002	0.002	0.01	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000029	0.002	0.0145	Used EUSES model

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000002	0.0025	0.00011	Used EUSES model
Marine water	mg/l	0	0.00025	0.000015	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00000002	0.002	0.000	Used EUSES model
Marine water sediment	mg/kg dwt	0	0.002	0.000001	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that
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	risks are managed to at least equivalent levels. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE5

surface treatment industry. - Sulfuric acid

ES Ref.: SE5

Date of issue: 26/05/2014

ES Type: Worker

Version: 1

Use descriptors	SU2a, SU3, SU14, SU15, SU16 PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13 PC14, PC15 ERC6b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Without LEV;Vapour recovery system;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %

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Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Complete segregation with ventilation and filtration of recirculated air	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear

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		suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.4 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C) Dedicated facility	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.5 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;Concentration: 98 %;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level	Exhaust air scrubber	
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(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.6 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 98 %;With LEV;Vapour recovery system)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.7 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

Physical form of product	Liquid
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Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.8 Contributing scenario controlling worker exposure (PROC13) (Duration: 8 Hours;Concentration: 98 %;Without LEV)

PROC13	Treatment of articles by dipping and pouring	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 10000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face

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		shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2 Contributing scenario controlling environmental exposure (ERC6b)

ERC6b	Industrial use of reactive processing aids
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 10000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	27.4 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0	0.0000 0009	0	0.0000 0018	Acute: ART tool Long term: ART tool
PROC2 (Duration: 8 Hours, Without LEV, Vapour recovery system, Concentration: 98 %)	0.00000009	0.0000 0092	0.00000009	0.0000 018	Acute: ART tool Long term: ART tool
PROC3 (Duration: 8 Hours, With LEV, Vapour recovery)	0.00042	0.004	0.00042	0.008	Acute: ART tool Long term: ART tool

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system, Concentration: 98 %)					
PROC4 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.014	0.14	0.014	0.28	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8 Hours, Concentration: 98 %, Without LEV)	0.023	0.23	0.023	0.46	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours, Concentration: 98 %, With LEV, Vapour recovery system)	0.00012	0.001	0.0000048	0.000096	Acute: ART tool Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.0032	0.032	0.0028	0.056	Acute: ART tool Long term: ART tool
PROC13 (Duration: 8 Hours, Concentration: 98 %, Without LEV)	0.018	0.18	0.016	0.32	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000059	0.0025	0.000	Used EUSES model
Marine water	mg/l	0.00000008	0.00025	0.000	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00000047	0.002	0.000	Used EUSES model
Marine water sediment	mg/kg dwt	0	0.002	0.000001	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE6

Electrolytical processes - Sulfuric acid

ES Ref.: SE6

Date of issue: 26/05/2014

ES Type: Worker

Version: 1

Use descriptors	SU3, SU14, SU15, SU17 PROC1, PROC2, PROC8b, PROC9, PROC13 PC14, PC20 ERC5, ERC6b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2306 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Without LEV;Vapour recovery system;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %

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Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 2306 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	
	Dedicated facility	
	Dedicated facility	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 98 %;With LEV;Vapour recovery system)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2306 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case

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		of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.4 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 98 %;Without LEV;Vapour recovery system)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2306 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.5 Contributing scenario controlling worker exposure (PROC13) (Duration: 8 Hours;Concentration: 98 %;Without LEV;With PRE)

PROC13	Treatment of articles by dipping and pouring
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2306 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Dedicated facility	
	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
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	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained	
	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing apparatus - efficiency of at least [%]:	95 %
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2.1 Contributing scenario controlling environmental exposure (ERC5)

ERC5	Industrial use resulting in inclusion into or onto a matrix
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2306
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	3160 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required. No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC6b)

ERC6b	Industrial use of reactive processing aids
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2306
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	3160 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	

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Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9) Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required. No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0	0.00000009	0	0.00000019	Acute: ART tool Long term: ART tool
PROC2 (Duration: 8 Hours, Without LEV, Vapour recovery system, Concentration: 98 %)	0.00000009	0.00000092	0.00000009	0.00000018	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours, Concentration: 98 %, With LEV, Vapour recovery system)	0.00012	0.001	0.0000048	0.00000096	Acute: ART tool Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 98 %, Without LEV, Vapour recovery system)	0.0032	0.032	0.0028	0.056	Acute: ART tool Long term: ART tool
PROC13 (Duration: 8 Hours, Concentration: 98 %, Without LEV, With PRE)	0.03	0.3	0.02	0.4	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000681	0.0025	0.027	Used EUSES model
Marine water	mg/l	0.00000987	0.00025	0.039	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000448	0.002	0.022	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000794	0.002	0.004	Used EUSES model

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Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000013	0.0025	0.000054	Used EUSES model
Marine water	mg/l	0.00000001	0.00025	0.0000788	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00000011	0.002	0.000058	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000001	0.002	0.0000079	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <PNEC. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

1. Exposure scenario SE7

Gas purification, scrubbing, flue gas scrubbing - Sulfuric acid

ES Ref.: SE7
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3, SU8 PROC1, PROC2, PROC8b PC20 ERC7
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 30000
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	Workers are in a separate control room

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Vapour recovery system;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

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Amounts used	Annual site tonnage (tonnes/year):	<= 30000
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
	Emissions source separated from respiratory tracts	Workers are in a separate control room

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.3 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;With LEV;Vapour recovery system;Concentration: 98 %)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 30000
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses

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	according to EN 166
Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2 Contributing scenario controlling environmental exposure (ERC5)

ERC5	Industrial use resulting in inclusion into or onto a matrix
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	30000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	<= 5000 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Ensure procedures and training for emergency decontamination and disposal are in place	
	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)
	No discharge of substance into waste water /Municipal STP	
	No application of sludge to soil	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, With LEV, Vapour recovery system, Concentration: 98 %)	0	0.0000 0009	0	0.0000 0019	Acute: ART tool Long term: ART tool
PROC2 (Duration: 8 Hours, Vapour recovery system, Concentration: 98 %)	0.00000009	0.000	0.00000009	0.000	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours, With	0.00012	0.001	0.0000048	0.000	Acute: ART tool

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LEV, Vapour recovery system, Concentration: 98 %)					Long term: ART tool
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3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000886	0.0025	0.035	Used EUSES model
Marine water	mg/l	0.0000128	0.00025	0.051	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000713	0.002	0.036	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000103	0.002	0.005	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE8

Production of lead acid batteries - Sulfuric acid

ES Ref.: SE8
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3 PROC2, PROC3, PROC4, PROC9 PC0 ERC2, ERC5
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;With LEV;Concentration: 98 %)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.2 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours;With LEV;Concentration: 98 %)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day

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Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;With LEV;Concentration: 98 %)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

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2.1.4 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;With LEV;Concentration: 98 %)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.2.1 Contributing scenario controlling environmental exposure (ERC2)

ERC2	Formulation of preparations	
Assessment method	Used EUSES model	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 hPa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	2500
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	12500 kg/day
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	

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Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC5)

ERC5	Industrial use resulting in inclusion into or onto a matrix
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2500
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	12.5 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	No discharge of substance into waste water /Municipal STP	
	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
	No application of sludge to soil	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use,Special connecting systems are in place to reduce the levels of gaseous emissions,All pipes, transfers lines and reactor are closed and sealed,Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required,Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems,Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC2 (Duration: 8 Hours,With LEV,Concentration: 98 %)	0.0016	0.016	0.0014	0.028	Acute: ART tool Long term: ART tool
PROC3 (Duration: 8 Hours,With LEV,Concentration: 98 %)	0.016	0.16	0.014	0.28	Acute: ART tool Long term: ART tool
PROC4 (Duration: 8 Hours,With LEV,Concentration: 98 %)	0.0014	0.014	0.0012	0.024	Acute: ART tool Long term: ART tool
PROC9	0.0014	0.014	0.0012	0.024	Acute: ART tool

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(Duration: 8 Hours, With LEV, Concentration: 98 %)					Long term: ART tool
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3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000369	0.0025	0.015	Used EUSES model
Marine water	mg/l	0.00000535	0.00025	0.021	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000297	0.002	0.015	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000043	0.002	0.002	Used EUSES model

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000738	0.0025	0.030	Used EUSES model
Marine water	mg/l	0.0000107	0.00025	0.043	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000594	0.002	0.030	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000088	0.002	0.004	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	measured exposure level <PNEC. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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1. Exposure scenario SE9

Battery maintenance - Sulfuric acid

ES Ref.: SE9

Date of issue: 26/05/2014

ES Type: Worker

Version: 1

Use descriptors	SU22 PROC19 PC0 ERC8b, ERC9b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC19) (Duration: 8 Hours; Concentration: 98 %)

PROC19	Hand-mixing with intimate contact and only PPE available
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.2.1 Contributing scenario controlling environmental exposure (ERC8b)

ERC8b	Wide dispersive indoor use of reactive substances in open systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2500
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	< 34.2 kg/day

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Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC9b)

ERC9b	Wide dispersive outdoor use of substances in closed systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2500
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	< 34.2 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber	
	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9)	
	Ensure procedures and training for emergency decontamination and disposal are in place	
Conditions and measures related to sewage treatment plant	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	dermal exposure: Qualitative approach used to conclude safe use,Special connecting systems are in place to reduce the levels of gaseous emissions,All pipes, transfers lines and reactor are closed and sealed,Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required,Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems,Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC19 (Duration: 8	0.0023	0.023	0.002	0.04	Acute: ART tool Long term: ART tool

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Hours, Concentration: 98 %)					
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3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000226	0.0025	0.009	Used EUSES model
Marine water	mg/l	0.0000226	0.00025	0.090	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000267	0.002	0.013	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000226	0.002	0.011	Used EUSES model

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000564	0.0025	0.023	Used EUSES model
Marine water	mg/l	0.0000564	0.00025	0.226	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000184	0.002	0.009	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000469	0.002	0.023	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed
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4.2. Environment

Guidance - Environment	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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Safety Data Sheet

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1. Exposure scenario SE10

Recycling of lead acid batteries - Sulfuric acid

ES Ref.: SE10
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3 PROC2, PROC4, PROC5, PROC8a PC0 ERC1
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;With LEV;Concentration: 25% - 40%)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	25% - 40%
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.2 Contributing scenario controlling worker exposure (PROC4) (Duration: 8 Hours;With LEV;Concentration: 25% - 40%)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	25% - 40%
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

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Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.3 Contributing scenario controlling worker exposure (PROC5) (Duration: 8 Hours;With LEV;Concentration: 25% - 40%)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	25% - 40%
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.1.4 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;With LEV;Concentration: 25% - 40%)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
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Concentration of substance in product	25% - 40%
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn

2.2 Contributing scenario controlling environmental exposure (ERC1)

ERC1	Manufacture of substances
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	25% - 40%
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	2500
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Release fraction to air from process :	34.2 kg/day

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
	Exhaust air scrubber	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from site	Ensure procedures and training for emergency decontamination and disposal are in place	
	Workers are fully trained	
Conditions and measures related to sewage treatment plant	No discharge of substance into waste water /Municipal STP	
	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use,Special connecting systems are in place to reduce the levels of gaseous emissions,All pipes, transfers lines and reactor are closed and sealed,Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required,Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems,Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC2 (Duration: 8 Hours,With LEV,Concentration: 25% - 40%)	0.0014	0.014	0.0012	0.024	Acute: ART tool Long term: ART tool
PROC4 (Duration: 8 Hours,With LEV,Concentration: 25% - 40%)	0.0046	0.046	0.004	0.08	Acute: ART tool Long term: ART tool
PROC5 (Duration: 8 Hours,With LEV,Concentration: 25% - 40%)	0.015	0.15	0.013	0.26	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8 Hours,With LEV,Concentration: 25% - 40%)	0.0069	0.069	0.006	0.12	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000738	0.0025	0.003	Used EUSES model
Marine water	mg/l	0.00000107	0.00025	0.004	Used EUSES model
Freshwater sediment	mg/kg dwt	0.00000594	0.002	0.003	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000086	0.002	0.000	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <DNEL. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. measured exposure level <PNEC
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

1. Exposure scenario SE11

Laboratory chemicals - Sulfuric acid

ES Ref.: SE11
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU22 PROC15 PC21 ERC8a, ERC8b
Processes, tasks, activities covered	Professional use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1 Contributing scenario controlling worker exposure (PROC15) (Duration: 8 Hours;Concentration: 98 %;With LEV)

PROC15	Use as laboratory reagent
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
	Suction hood	Exhaust gas must be neutralised
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2.1 Contributing scenario controlling environmental exposure (ERC8a)

ERC8a	Wide dispersive indoor use of processing aids in open systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	5000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting	Indoor use	

SULPHURIC ACID

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according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

environmental exposure	Release fraction to air from process :	<= 1370 kg/day
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Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste treatment	
	Suction hood	Exhaust gas must be neutralised
Organisation measures to prevent/limit release from site	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC8b)

ERC8b	Wide dispersive indoor use of reactive substances in open systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	5000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Indoor use	
	Release fraction to air from process :	<= 1370 kg/day

Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste treatment	
	Suction hood	Exhaust gas must be neutralised
Organisation measures to prevent/limit release from site	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC15 (Duration: 8 Hours, Concentration: 98 %, With LEV)	0.00027	0.003	0.00023	0.005	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
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Freshwater	mg/l	0.000134	0.0025	0.054	Used EUSES model
Marine water	mg/l	0.000108	0.00025	0.432	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000267	0.002	0.013	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000604	0.002	0.000001	Used EUSES model

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000221	0.0025	0.001	Used EUSES model
Marine water	mg/l	0.00000005	0.00025	0.000	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000017	0.002	0.001	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000005	0.002	0.000001	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	measured exposure level <PNEC. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

1. Exposure scenario SE12

Industrial cleaner - Sulfuric acid

ES Ref.: SE12

Date of issue: 26/05/2014

ES Type: Worker

Version: 1

Use descriptors	SU3 PROC2, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13 PC35 ERC8a, ERC8b
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours;Concentration: 10 %;With LEV;Indoor use)

PROC2	Use in closed, continuous process with occasional controlled exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC5) (Duration: 8 Hours;Concentration: 10 %;With LEV;Indoor use)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

SULPHURIC ACID

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Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405). Long-term - local effects, inhalation --) Breathing apparatus - efficiency of at least 95%
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.3 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;Concentration: 10 %;Indoor use;Without LEV)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.4 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 10 %;Indoor use;Without LEV)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.5 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 10 %;Without LEV;Indoor use)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.6 Contributing scenario controlling worker exposure (PROC10) (Duration: 8 Hours;Concentration: 10 %;Indoor use;Without LEV;With PRE)

PROC10	Roller application or brushing
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

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Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	Breathing apparatus - efficiency of at least 95%
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.7 Contributing scenario controlling worker exposure (PROC13) (Duration: 8 Hours;Concentration: 10 %;Indoor use;Without LEV)

PROC13	Treatment of articles by dipping and pouring
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.2.1 Contributing scenario controlling environmental exposure (ERC8a)

ERC8a	Wide dispersive indoor use of processing aids in open systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	5000
Frequency and duration of use	Intermittent release	
Other given operational conditions affecting	Indoor use	

SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

environmental exposure	Release fraction to air from process :	<= 1370 kg/day
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Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste treatment	
	with local exhaust ventilation	
Organisation measures to prevent/limit release from site	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

2.2.2 Contributing scenario controlling environmental exposure (ERC8b)

ERC8b	Wide dispersive indoor use of reactive substances in open systems
Assessment method	Used EUSES model

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	10 %
Vapour pressure	6 hPa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	5000
Frequency and duration of use	Intermittent release	
Other given operational conditions affecting environmental exposure	Indoor use	
	Release fraction to air from process :	<= 1370 kg/day

Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste treatment	
	with local exhaust ventilation	
Organisation measures to prevent/limit release from site	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
Conditions and measures related to external treatment of waste for disposal	Not applicable	
Conditions and measures related to external recovery of waste	Not required	

3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC2 (Duration: 8 Hours, Concentration: 10 %, With LEV, Indoor use)	0.00055	0.006	0.00048	0.010	Acute: ART tool Long term: ART tool
PROC5 (Duration: 8 Hours, Concentration: 10 %, With LEV, Indoor use)	0.061	0.61	0.0027	0.054	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8	0.0055	0.055	0.0048	0.096	Acute: ART tool Long term: ART tool

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Hours, Concentration: 10 % ,Indoor use, Without LEV)					
PROC8b (Duration: 8 Hours, Concentration: 10 % ,Indoor use, Without LEV)	0.0055	0.055	0.0048	0.096	Acute: ART tool Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 10 % ,Without LEV, Indoor use)	0.0055	0.055	0.0048	0.096	Acute: ART tool Long term: ART tool
PROC10 (Duration: 8 Hours, Concentration: 10 % ,Indoor use, Without LEV, With PRE)	0.03	0.3	0.027	0.54	Acute: ART tool Long term: ART tool
PROC13 (Duration: 8 Hours, Concentration: 10 % ,Indoor use, Without LEV)	0.0061	0.061	0.0053	0.106	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.000134	0.0025	0.054	Used EUSES model
Marine water	mg/l	0.000108	0.00025	0.432	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000267	0.002	0.013	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000604	0.002	0.000001	Used EUSES model

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00000221	0.0025	0.001	Used EUSES model
Marine water	mg/l	0.00000005	0.00025	0.000	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000017	0.002	0.001	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000005	0.002	0.000001	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	measured exposure level <PNEC. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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SULPHURIC ACID

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

1. Exposure scenario SE13

Formulation [mixing] of preparations and/or re-packaging (excluding alloys) - Sulfuric acid

ES Ref.: SE13
ES Type: Worker
Version: 1

Date of issue: 26/05/2014

Use descriptors	SU3, SU10 PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9 ERC2
Processes, tasks, activities covered	Industrial use
Assessment method	ART tool Worst case assumption

2. Operational conditions and risk management measures

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Duration: 8 Hours;Concentration: 98 %;With LEV;Indoor use;Vapour recovery system)

PROC1	Use in closed process, no likelihood of exposure
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.2 Contributing scenario controlling worker exposure (PROC3) (Duration: 8 Hours;Concentration: 98 %;With LEV;Indoor use;Vapour recovery system)

PROC3	Use in closed batch process (synthesis or formulation)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	

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Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.3 Contributing scenario controlling worker exposure (PROC5) (Duration: 8 Hours;Concentration: 98 %;With LEV;Indoor use)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions

Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.4 Contributing scenario controlling worker exposure (PROC8a) (Duration: 8 Hours;Concentration: 98 %;With LEV;Indoor use;Vapour recovery system)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

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Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.5 Contributing scenario controlling worker exposure (PROC8b) (Duration: 8 Hours;Concentration: 98 %;With LEV;Indoor use;Vapour recovery system)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	98 %
Vapour pressure	6 Pa

Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	with local exhaust ventilation	
	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing

2.1.6 Contributing scenario controlling worker exposure (PROC9) (Duration: 8 Hours;Concentration: 98 %;Vapour recovery system;Indoor use;Without LEV)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	<= 300000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting workers exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Vapour recovery system	
Organisational measures to prevent /limit releases, dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection equipment
	Workers are fully trained	
Conditions and measures related to personal protection, hygiene and health evaluation	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	
	Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	Hand protection	Acid-resistant protective gloves
	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing
2.2 Contributing scenario controlling environmental exposure (ERC2)		
ERC2	Formulation of preparations	
Assessment method	Used EUSES model	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 hPa	
Operational conditions		
Amounts used	Annual site tonnage (tonnes/year):	300000
Frequency and duration of use	Continuous use/release	
Other given operational conditions affecting environmental exposure	Indoor use	
	Release fraction to air from process :	<= 205 kg/day
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste gas emissions must be scrubbed	
	Waste treatment	
	Neutralize contaminated cleaning water prior to disposal (pH 6 to 9) with local exhaust ventilation	
Organisation measures to prevent/limit release from site	Workers are fully trained	
Conditions and measures related to sewage treatment plant	Onsite wastewater treatment required	
	No discharge of substance into waste water /Municipal STP	
	No application of sludge to soil	
Conditions and measures related to external treatment of waste for disposal	Sewage Sludge incineration / Landfill	
Conditions and measures related to external recovery of waste	Not required	

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3. Exposure estimation and reference to its source

3.1. Health

Information for contributing exposure scenario	
2.1.1	dermal exposure: Qualitative approach used to conclude safe use, All pipes, transfers lines and reactor are closed and sealed, Special connecting systems are in place to reduce the levels of gaseous emissions, Specialised tanker coupling/uncoupling systems and targeted purging systems may be used where large volumes and high concentrations are required, Workers must receive the training and the certification to respect the procedure in order to use correctly these specialized systems, Emergency procedures

Local - Inhalation					
DNEL	Acute: 0.1 mg/m ³ Long-term: 0.05 mg/m ³				
Contributing Scenario	Acute mg/m ³	RCR	Long term mg/m ³	RCR	Assessment method
PROC1 (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use, Vapour recovery system)	0	0.0000 0009	0	0.0000 0019	Acute: ART tool Long term: ART tool
PROC3 (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use, Vapour recovery system)	0.00042	0.004	0.00042	0.008	Acute: ART tool Long term: ART tool
PROC5 (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use)	0.018	0.18	0.016	0.32	Acute: ART tool Long term: ART tool
PROC8a (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use, Vapour recovery system)	0.023	0.23	0.023	0.46	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use, Vapour recovery system)	0.00012	0.001	0.0000048	0.000	Acute: ART tool Long term: ART tool
PROC9 (Duration: 8 Hours, Concentration: 98 %, Vapour recovery system, Indoor use, Without LEV)	0.0032	0.032	0.0028	0.056	Acute: ART tool Long term: ART tool

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000443	0.0025	0.018	Used EUSES model
Marine water	mg/l	0.00000642	0.00025	0.026	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000356	0.002	0.018	Used EUSES model
Marine water sediment	mg/kg dwt	0.00000516	0.002	0.000001	Used EUSES model

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	measured exposure level <DNEL. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are
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	adopted, then users should ensure that risks are managed to at least equivalent levels
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4.2. Environment

Guidance - Environment	measured exposure level <PNEC. Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Do not eat, drink or smoke during use. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Comply with the safety procedures
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