

## Safety Data Sheet

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

Date of issue: 6/1/2011 Revision date: 5/25/2016 Supersedes: 5/26/2014 Version: 9.0

## 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 : H2SO4

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 repackaging (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 BT12 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]

H314

Skin corrosion/irritation,

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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

#### **Mixture**

Not applicable

#### **SECTION 4: First aid measures**

#### **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-aider). 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, rince 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.

#### Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation Symptoms/injuries after skin contact : Burns of respiratory tract. Death in extreme cases. : Causes burns. May cause severe irreversible damage.

Symptoms/injuries after eye contact Symptoms/injuries after ingestion

: Causes serious eye damage. Can cause blindness. : 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

#### **Extinguishing media**

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

## Special hazards arising from the substance or mixture

Fire hazard

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

### **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**

#### 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

#### **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/m³)	0.05 mg/m³	
EU	IOELV STEL (mg/m³)	0.1 mg/m³	
Sulfuric acid (7664-93-9)	Sulfuric acid (7664-93-9)		
EU	IOELV TWA (mg/m³)	0.05 mg/m³	
EU	IOELV STEL (mg/m³)	0.1 mg/m³	

SULPHURIC ACID (7664-93-9)	
DNEL/DMEL (Workers)	
Acute - local effects, inhalation	0.1 mg/m³
Long-term - local effects, inhalation	0.05 mg/m³
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 : (

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 No data available Decomposition temperature Flammability (solid, gas) : No data available · No data available Vapour pressure Relative vapour density at 20 °C : No data available : No data available Relative density

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/m³ ( 4 Hours - Similar to:OECD 403)

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

0 :Ha

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- Lepomis macrochirus)
EC50 Daphnia 1	> 100 mg/l (48h - Daphnia magna, OECD 202)
NOEC chronic fish	0.025 mg/l (Salvelinus fontinalis)
NOEC chronic crustacea	0.15 mg/l (Tanytarsus dissimulis)
NOEC chronic algae	100 mg/l (72h - Desmodesmus subspicatus, 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) : 11
Excepted quantities (ADR) : E2
Hazard identification number (Kemler No.) : 80

Orange plates

80 1830

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

#### **National regulations** 15 1 2

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

Date of issue: 26/05/2014	ES Ref.: SE2
	ES Type: Worker
	Version: 1

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 %)

system;Concentration: 98	%)				
PROC1	Use in closed process, no likelihood of exposure				
Product characteristics	<u>.</u>				
Physical form of product		Liquid			
Concentration of substance	e 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 Measu	ires				
Technical conditions and measures at process level		Exhaust air scrubber			
(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		Vapour recovery system. with local exhaust ventilation			
		Workers are in a separate control room			
Organisational measures t	o prevent /limit releases,	Workers are fully trained			
dispersion and exposure		Personal protective equipment	Familiarize personnel with proper use of protection equipment		

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# Safety Data Sheet

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

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		
.1.2 Contributing scenario controlling worker exystem;Concentration: 98 %)	xposure (PROC2) (Duration: 8 Hours;Without LEV;Vap	oour recovery		
• • •	s process with occasional controlled exposure			
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	Dedicated facility	O Til day		
exposure	Operation is carried out at elevated temperature (50°C - 150 °C)			
	Complete segregation with ventilation and filtration			
Risk Management Measures	of recirculated air			
Technical conditions and measures at process level	Exhaust air scrubber			
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed			
Technical conditions and measures to control	Vapour recovery system			
dispersion from source towards the worker	Workers are in a separate control room			
Organisational measures to prevent /limit releases,	Workers are fully trained			
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 cas of insufficient ventilation, wea 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		
	xposure (PROC3) (Duration: 8 Hours;With LEV;Vapou			
ystem;Concentration: 98 %)	cess (synthesis or formulation)			
ystem;Concentration: 98 %)	eess (synthesis or formulation)			
PROC3 Use in closed batch proc  Product characteristics	ess (synthesis or formulation)  Liquid			
ystem;Concentration: 98 %) PROC3 Use in closed batch proc				
PROC3 Use in closed batch proc  Product characteristics  Physical form of product	Liquid			

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Frequency and duration of use

**Risk Management Measures** 

(source) to prevent release

Other given operational conditions affecting workers

Technical conditions and measures at process level

# Safety Data Sheet

Amounts used

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

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,		Workers are fully trained					
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 scena recovery system)	rio controlling worker exp	posure (PROC4) (Duration: 8 Hours; Concentration: 98					
PROC4	Use in batch and other pro	ocess (synthesis) where opportunity for exposure arises					
Product characteristics	· · · · · · · · · · · · · · · · · · ·						
Physical form of product		Liquid					
Concentration of substance i	n product	98 %					
Vapour pressure		6 Pa	6 Pa				
Operational conditions							
Amounts used		Maximum daily site tonnage (kg/day):	<= 500 T				
Frequency and duration of us	se	Exposure duration	8 h/day				
Other given operational cond exposure		Operation is carried out at elevated temperature (50°C - 150 °C)  Dedicated facility					
Risk Management Measure	ne .	Dedicated identity					
Technical conditions and me (source) to prevent release		All pipes, transfers lines and reactor are closed and sealed					
		Exhaust air scrubber					
Technical conditions and me dispersion from source toward	ds 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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Maximum daily site tonnage (kg/day):

Operation is carried out at elevated temperature  $(50^{\circ}\text{C} - 150^{\circ}\text{C})$ 

All pipes, transfers lines and reactor are closed and

Exposure duration

Exhaust air scrubber

sealed

Dedicated facility

<= 500 T

8 h/day

# Safety Data Sheet

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

		worn
	xposure (PROC8a) (Duration: 8 Hours;Concentration:	
facilities	preparation (charging/discharging) from/to vessels/large	containers at non dedicated
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		<u> </u>
Technical conditions and measures at process level	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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 cas of insufficient ventilation, wea 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
1.6 Contributing scenario controlling worker executively system)	posure (PROC8b) (Duration: 8 Hours;Concentration:	98 %;With LEV;Vapour
	preparation (charging/discharging) from/to vessels/large	containers at dedicated facilities
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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
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	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases,	Workers are fully trained	
dispersion and exposure	Personal protective equipment	Familiarize personnel with proper use of protection
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Skin and body protection

shield with safety glasses according to EN 166 Acid-resistant clothing. Impervious footwear must be

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		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 ex recovery system)	posure (PROC9) (Duration: 8 Hours;Concentration: 98	3 %;Without LEV;Vapour
PROC9 Transfer of substance or	preparation into small containers (dedicated filling line, inc	cluding weighing)
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
<del>-</del>	6 Pa	
Vapour pressure	ога	
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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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	Impervious footwear must be worn. Acid-resistant clothing
2.2 Contributing scenario controlling environme	ental exposure (ERC6a)	
	manufacture of another substance (use of intermediates)	
Assessment method Used EUSES model	( 5	
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	Dedicated facility	
(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	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	
plant	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment	Sewage Sludge incineration / Landfill	
of waste for disposal	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/m³					
	Long-term: 0.05 mg/m³					
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method	
PROC1	0	0.0000	0	0.0000	Acute: ART tool	
(Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)		009		018	Long term: ART tool	
PROC2	0.00000009	0.0000	0.00000009	0.0000	Acute: ART tool	
(Duration: 8 Hours,Without LEV,Vapour recovery system,Concentration: 98 %)		0092		018	Long term: ART tool	
PROC3	0.00042	0.004	0.00042	0.008	Acute: ART tool	
(Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)					Long term: ART tool	
PROC4	0.014	0.14	0.014	0.28	Acute: ART tool	
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					Long term: ART tool	
PROC8a	0.023	0.23	0.023	0.46	Acute: ART tool	
(Duration: 8 Hours,Concentration: 98 %,Without LEV)					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	0.0032	0.032	0.0028	0.056	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					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. in<="" supervision="" th=""></dnel.>
	place to check that the RMMs in place are being used correctly and OCs followed

#### 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< td=""></pnec<>

# Additional good practice advice beyond the REACH CSA

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
belong dating, difficulting and which leaving work. Comply with the ballety procedures

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# Safety Data Sheet

PROC1

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

## 1. Exposure scenario SE3

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

ES Ref.: SE3	Date of issue: 26/05/2014
ES Type: Worker	
Version: 1	

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 %)

Use in closed process, no likelihood of exposure

	000 0.000u p. 0000u,			
Product characteristics				
Physical form of product		Liquid		
Concentration of substance in	n product	98 %		
Vapour pressure		6 Pa		
Operational conditions				
Amounts used		Maximum daily site tonnage (kg/day):	<= 500 T	
Frequency and duration of us	se	Exposure duration	8 h/day	
Other given operational condi	itions affecting workers	Dedicated facility		
exposure		Operation is carried out at elevated temperature (50°C - 150 °C)		
		Emissions source separated from respiratory tracts		
Risk Management Measure	s			
Technical conditions and mea	asures at process level	Exhaust air scrubber		
(source) to prevent release		All pipes, transfers lines and reactor are closed and sealed		
Technical conditions and meadispersion from source toward		Vapour recovery system. with local exhaust ventilation		
		Workers are in a separate control room		
Organisational measures to p	prevent /limit releases,	Workers are fully trained		
dispersion and exposure		Personal protective equipment	Familiarize personnel with proper use of protection equipment	
Conditions and measures rela protection, hygiene and healt		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 p	process with occasional controlled exposure
Product characteristics		
Physical form of product		Liquid
Concentration of substance i	n product	98 %

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Frequency and duration of use

Other given operational conditions affecting workers

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Vapour pressure

Operational conditions

Amounts used

exposure

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

6 Pa

Exposure duration

Dedicated facility

Maximum daily site tonnage (kg/day):

Operation is carried out at elevated temperature (50°C - 150 °C)
Emissions source separated from respiratory tracts

<= 500 T

8 h/day

D: 1 14		
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	Workers are in a separate control room	
dispersion from source towards the worker	Vapour recovery system	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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
ystem;Concentration: 98 %)	ess (synthesis or formulation)	r recovery
PROC3 Use in closed batch proc Use in closed batch proc	cess (synthesis or formulation)	r recovery
PROC3 Use in closed batch proc Product characteristics Physical form of product	cess (synthesis or formulation)	r recovery
PROC3 Use in closed batch proc  Product characteristics  Physical form of product  Concentration of substance in product	cess (synthesis or formulation)  Liquid 98 %	r recovery
PROC3 Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure	cess (synthesis or formulation)	r recovery
PROC3 Use in closed batch proceed by the process of the product of the process of the product of the process of the product of the product of the process of	cess (synthesis or formulation)  Liquid 98 % 6 Pa	
PROC3 Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used	cess (synthesis or formulation)  Liquid 98 % 6 Pa  Maximum daily site tonnage (kg/day):	<= 500 T
PROC3  Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use	Liquid 98 % 6 Pa  Maximum daily site tonnage (kg/day): Exposure duration	
PROC3  Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers	Liquid  98 % 6 Pa  Maximum daily site tonnage (kg/day): Exposure duration  Dedicated facility	<= 500 T
PROC3  Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Department conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers	Liquid 98 % 6 Pa  Maximum daily site tonnage (kg/day): Exposure duration	<= 500 T
PROC3 Use in closed batch proceed by the process of the product of	Liquid  98 % 6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Operation is carried out at elevated temperature	<= 500 T
PROC3 Use in closed batch proceed by the process of the product of the process of the product of	Liquid  98 % 6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Operation is carried out at elevated temperature	<= 500 T
PROC3  Use in closed batch process  Product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures at process level (source) to prevent release	Exposure duration    Dedicated facility	<= 500 T
PROC3 Use in closed batch process  Product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures at process level (source) to prevent release  Technical conditions and measures to control	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Operation is carried out at elevated temperature (50°C - 150 °C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and	<= 500 T
PROC3 Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures at process level (source) to prevent release  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases,	Exposure duration    Liquid   98 %   6 Pa	<= 500 T
PROC3  Use in closed batch processory  Product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures at process level (source) to prevent release  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Operation is carried out at elevated temperature (50°C - 150 °C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Vapour recovery system. with local exhaust ventilation  Workers are fully trained  Personal protective equipment	<= 500 T
PROC3 Use in closed batch proceed by the product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures at process level (source) to prevent release  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases,	Liquid  98 % 6 Pa  Maximum daily site tonnage (kg/day): Exposure duration  Dedicated facility  Operation is carried out at elevated temperature (50°C - 150 °C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Vapour recovery system. with local exhaust ventilation  Workers are fully trained	<= 500 T  8 h/day  Familiarize personnel with proper use of protection

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			of insufficient ventilation, wear
			suitable respiratory
		Hand protection	equipment(EN 141 / EN 405) 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
.1.4 Contributing scenar ecovery system)		posure (PROC4) (Duration: 8 Hours;Concentration: 9	
PROC4	Use in batch and other pr	rocess (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		Maximum daily site tonnage (kg/day):	<= 500 T
Frequency and duration of use	Э	Exposure duration	8 h/day
Other given operational conditexposure	ions affecting workers	Operation is carried out at elevated temperature (50°C - 150 °C)	
		Dedicated facility	
Risk Management Measures			
Technical conditions and mea (source) to prevent release	sures at process level	All pipes, transfers lines and reactor are closed and sealed	
<del>-</del>		Exhaust air scrubber	
Technical conditions and mea dispersion from source toward		Vapour recovery system	
Organisational measures to padispersion and exposure	revent /limit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment
		Workers are fully trained	
Conditions and measures rela protection, hygiene and health		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 cas of insufficient ventilation, wea suitable respiratory equipment(EN 141 / EN 405)
		Hand protection	Acid-resistant protective
		Eye protection	gloves Chemical goggles or face shield with safety glasses
		Skin and body protection	according to EN 166 Acid-resistant clothing. Impervious footwear must be worn
1.5 Contributing scenar	io controllina worker ex	posure (PROC8a) (Duration: 8 Hours;Concentration:	
PROC8a		preparation (charging/discharging) from/to vessels/large	
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in	product	98 %	
Vapour pressure		6 Pa	
Operational conditions			
o por acronar contactions		Maximum daily site tonnage (kg/day):	<= 500 T
		Exposure duration	8 h/day
Amounts used	Э	Exposure duration	OTIVALLY
Amounts used Frequency and duration of use		Dedicated facility	0 Tirday
Amounts used Frequency and duration of use Other given operational condit exposure		•	Uniday

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# Safety Data Sheet

Product characteristics

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

Technical conditions and measures at process level	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and	
Organisational measures to prevent /limit releases,	Sealed Workers are fully trained	
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 cas of insufficient ventilation, wea 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 executery system)	posure (PROC8b) (Duration: 8 Hours;Concentration: 9	98 %;With LEV;Vapour
PROC8b Transfer of substance or	preparation (charging/discharging) from/to vessels/large	containers at dedicated facilities
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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures	1 = 3 3/	
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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 cas of insufficient ventilation, we 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 executery system)	posure (PROC9) (Duration: 8 Hours;Concentration: 98	3 %;Without LEV;Vapour
PROC9 Transfer of substance or	preparation into small containers (dedicated filling line, inc	cluding weighing)

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Concentration of substance in product

# Safety Data Sheet

Vapour pressure

Amounts used

Physical form of product

Operational conditions

Frequency and duration of use

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

Liquid

98 %

6 Pa

Exposure duration

Maximum daily site tonnage (kg/day):

<= 500 T 8 h/day

Other given operational conditions affecting workers	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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	Impervious footwear must be worn. Acid-resistant clothing
	sposure (PROC13) (Duration: 8 Hours;Concentration: 9 dipping and pouring	98 %;Without LEV)
PROC13 Treatment of articles by of Product characteristics	dipping and pouring	98 %;Without LEV)
PROC13 Treatment of articles by a Product characteristics Physical form of product	dipping and pouring  Liquid	98 %;Without LEV)
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product	Liquid 98 %	98 %;Without LEV)
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure	dipping and pouring  Liquid	98 %;Without LEV)
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions	Liquid  98 % 6 Pa	
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used	Liquid 98 % 6 Pa  Maximum daily site tonnage (kg/day):	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use	Liquid 98 % 6 Pa  Maximum daily site tonnage (kg/day): Exposure duration	
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures at process level	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-25°C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures at process level (source) to prevent release Organisational measures to prevent /limit releases,	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-25°C)  Exhaust air scrubber	<= 500 T
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures at process level (source) to prevent release Organisational measures to prevent /limit releases,	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-25°C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed	<= 500 T  8 h/day  Familiarize personnel with proper use of protection
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures at process level (source) to prevent release Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-25°C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Workers are fully trained  Personal protective equipment  Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure	<= 500 T  8 h/day  Familiarize personnel with proper use of protection equipment
PROC13 Treatment of articles by of Product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures	Liquid  98 %  6 Pa  Maximum daily site tonnage (kg/day):  Exposure duration  Dedicated facility  Assumes activities are at room temperature (15-25°C)  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Workers are fully trained  Personal protective equipment  Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any	<= 500 T  8 h/day  Familiarize personnel with proper use of protection

# Safety Data Sheet

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

		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 Contributing scer	nario controlling environme	ntal exposure (ERC6b)		
ERC6b	Industrial use of reactive p	processing aids		
Assessment method	Used EUSES model			
Product characteristics	<u>.</u>			
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 Measu	res			
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		
0 199		/Municipal ŠTP		
Conditions and measures r of waste for disposal	elated to external treatment	Sewage Sludge incineration / Landfill		
•		No application of sludge to soil		
Conditions and measures related to external recovery of waste		Not required		
41 41	on and reference to its			

J. I. 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/m³ Long-term: 0.05 mg/m	3			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0	0.0000	0	0.0000	Acute: ART tool
(Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)		0009		0007	Long term: ART tool
PROC2	0.00000009	0.0000	0.00000009	0.0000	Acute: ART tool
(Duration: 8 Hours,Without LEV,Vapour recovery system,Concentration: 98 %)		0092		018	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	0.014	0.14	0.014	0.28	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					Long term: ART tool
PROC8a	0.023	0.23	0.023	0.46	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV)					Long term: ART tool
PROC8b	0.00012	0.001	0.0000048	0.0000	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,With LEV,Vapour recovery system)				96	Long term: ART tool
PROC9	0.0032	0.032	0.0028	0.056	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					Long term: ART tool
PROC13	0.018	0.18	0.016	0.32	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV)					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 ensu		
	that risks are managed to at least equivalent levels. measured exposure level <dnel. in<="" supervision="" th=""></dnel.>		
	place to check that the RMMs in place are being used correctly and OCs followed		

### 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< td=""></pnec<>

# 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 SE4

# Extractions and processing of minerals and ores

Date of issue: 26/05/2014

worn

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	Use in closed, continuous process with occasional controlled exposure				
Product characterist	tics					
Physical form of product		Liquid				
Concentration of substance in product		98 %	98 %			
Vapour pressure		6 Pa				
Operational condition	ons					
Amounts used		Annual site tonnage (tonnes/year):	<= 480 T			
Frequency and duration	on of use	Exposure duration	8 h/day			
	al conditions affecting workers	Dedicated facility				
exposure		Operation is carried out at elevated temperature (50°C - 150 °C)				
		Emissions source separated from respiratory tracts				
Risk Management M	leasures					
	and measures at process level	Exhaust air scrubber				
(source) to prevent release		All pipes, transfers lines and reactor are closed and sealed				
	and measures to control	Vapour recovery system				
dispersion from source	e towards the worker	Workers are in a separate control room				
	ures to prevent /limit releases,	Workers are fully trained				
dispersion and exposure		Personal protective equipment	Familiarize personnel with proper use of protection equipment			
Conditions and measu protection, hygiene ar	ures related to personal nd 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			

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

Cycloni, Concontration Co 70				
PROC3	Use in closed batch process (synthesis or formulation)			
Product characteristics				
Physical form of product		Liquid		
Concentration of substance in product		98 %		

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Frequency and duration of use

# Safety Data Sheet

Vapour pressure

Operational conditions

Amounts used

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

6 Pa

Annual site tonnage (tonnes/year):

Exposure duration

<= 480 T

Chemical goggles or face

8 h/day

4,		· · · · · · · · · · · · · · · · · · ·
Other given operational conditions affecting workers	Dedicated facility	
exposure	Operation is carried out at elevated temperature (50°C - 150 °C)	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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
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	of insufficient ventilation, wear

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Eye protection

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

			shield with safety glasses according to EN 166
		Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn
.2.1 Contributing scer	nario controlling environme	ntal exposure (ERC4)	
ERC4	Industrial use of processin	g aids in processes and products, not becoming part of a	rticles
Assessment method	Used EUSES model		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance	e 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 corenvironmental exposure	nditions affecting	Release fraction to air from process :	1.14 kg/day
Risk Management Measu	res		
Technical conditions and m		Exhaust air scrubber	
(source) to prevent release		All pipes, transfers lines and reactor are closed and sealed	
		Dedicated facility	
Technical onsite conditions limit discharges, air emission	s and measures to reduce or ons 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 psite	prevent/limit release from	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  Conditions and measures related to external treatment of waste for disposal		Onsite wastewater treatment required	
		No discharge of substance into waste water /Municipal STP	
		Sewage Sludge incineration / Landfill	
		No application of sludge to soil	
Conditions and measures related to external recovery of waste		Not required	
.2.2 Contributing scer	nario controlling environme	ntal exposure (FRC6b)	
ERC6b	Industrial use of reactive p	• • •	
Assessment method	Used EUSES model		
Product characteristics	Coca EccEc model		
Physical form of product		Liquid	
	o in product	98 %	
Concentration of substance		1 30 70	
Vapour pressure	e iii product	6 hPa	
Vapour pressure	e in product	6 hPa	
Vapour pressure  Operational conditions	e iii product		400
Vapour pressure  Operational conditions  Amounts used		Annual site tonnage (tonnes/year):	480
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational con	use		480 1.14 kg/day
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure	use nditions affecting	Annual site tonnage (tonnes/year):  Continuous use/release	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure  Risk Management Measu	use nditions affecting	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process :	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure  Risk Management Measu  Technical conditions and management	use Inditions affecting Ires Ineasures at process level	Annual site tonnage (tonnes/year): Continuous use/release Release fraction to air from process :  Exhaust air scrubber	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure  Risk Management Measu	use Inditions affecting Ires Ineasures at process level	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process:  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure  Risk Management Measu  Technical conditions and m (source) to prevent release	use Inditions affecting Ires Ineasures at process level	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process :  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Dedicated facility	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational condenvironmental exposure  Risk Management Measu  Technical conditions and m (source) to prevent release	use Inditions affecting Ires Ineasures at process level Is and measures to reduce or	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process:  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational conditions environmental exposure  Risk Management Measu  Technical conditions and m (source) to prevent release  Technical onsite conditions limit discharges, air emissions	use Inditions affecting Ires Ineasures at process level Is and measures to reduce or ons and releases to soil	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process:  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Dedicated facility  User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP  Waste treatment	
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of  Other given operational corenvironmental exposure  Risk Management Measu  Technical conditions and mr (source) to prevent release	use Inditions affecting Ires Ineasures at process level Is and measures to reduce or ons and releases to soil	Annual site tonnage (tonnes/year):  Continuous use/release  Release fraction to air from process:  Exhaust air scrubber  All pipes, transfers lines and reactor are closed and sealed  Dedicated facility  User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP	

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plant	No discharge of substance into waste water /Municipal STP	
Conditions and measures related to external treatment	Sewage Sludge incineration / Landfill	
of waste for disposal	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/m³				
	Long-term: 0.05 mg/m	3			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC2	0.00000009	0.0000	0.00000009	0.0000	Acute: ART tool
(Duration: 8 Hours,Without LEV,Vapour recovery system,Concentration: 98 %)		0092		018	Long term: ART tool
PROC3	0.00042	0.004	0.00042	0.008	Acute: ART tool
(Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)					Long term: ART tool
PROC4	0.014	0.14	0.014	0.28	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					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. in<="" supervision="" td=""></dnel.>
	place to check that the RMMs in place are being used correctly and OCs followed

### 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< th=""></pnec<>

# 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	

shield with safety glasses according to EN 166

Impervious footwear must be worn. Acid-resistant clothing

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

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

PROC1 Use in closed process	Use in closed process, no likelihood of exposure			
Product characteristics				
Physical form of product	Liquid			
Concentration of substance in product	98 %	98 %		
Vapour pressure	6 Pa	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	Dedicated facility			
exposure	Operation is carried out at elevated temperature (50°C - 150 °C)			

Exhaust air scrubber

Emissions source separated from respiratory tracts

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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	Vapour recovery system. with local exhaust ventilation	
	Workers are in a separate control room	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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

#### 2.1.2 Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours; Without LEV; Vapour recovery

PROC2	Use in closed, continuous process with occasional controlled exposure		
Product characteristics			
Physical form of product Liquid			
Concentration of substance in product		98 %	

Skin and body protection

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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	Dedicated facility	
exposure	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	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control	Vapour recovery system	
dispersion from source towards the worker	Workers are in a separate control room	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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 cas of insufficient ventilation, wea 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
ystem;Concentration: 98 %)	cposure (PROC3) (Duration: 8 Hours; With LEV; Vapouress (synthesis or formulation)	r recovery
Product characteristics	(-)	
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
	UT a	
Operational conditions	Ammunicate to proceed (to procedure on).	4- 40000 T
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	
Pick Management Massures	(50°C - 150 °C)	
Risk Management Measures	Exhaust air sarubhar	
Technical conditions and measures at process level (source) to prevent release	Exhaust air scrubber  All pipes, transfers lines and reactor are closed and	
Technical conditions and measures to control	sealed   Vapour recovery system. with local exhaust ventilation	
dispersion from source towards the worker		
Organisational measures to prevent /limit releases, dispersion and exposure	Workers are fully trained  Personal protective equipment	Familiarize personnel with proper use of protection
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	equipment
procession, mygione and nearm evaluation	potential exposure  Breathing equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In cas of insufficient ventilation, wea

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		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	
1.4 Contributing scenario ecovery system)	controlling worker ex	cposure (PROC4) (Duration: 8 Hours;Concentration: 9	8 %;Without LEV;Vapour	
PROC4 Us	e in batch and other p	rocess (synthesis) where opportunity for exposure arises		
Product characteristics				
Physical form of product		Liquid		
Concentration of substance in pro	oduct	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 condition exposure	s affecting workers	Operation is carried out at elevated temperature (50°C - 150 °C)  Dedicated facility		
Risk Management Measures		2 Salisation (assump		
Technical conditions and measur	res at process level	All pipes, transfers lines and reactor are closed and		
(source) to prevent release	oo at process level	sealed		
· ·		Exhaust air scrubber		
Technical conditions and measur dispersion from source towards t		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 cas of insufficient ventilation, we 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	
1.5 Contributing scenario	controlling worker ex	(posure (PROC8a) (Duration: 8 Hours;Concentration:		
PROC8a Tra		preparation (charging/discharging) from/to vessels/large		
Product characteristics				
Physical form of product		Liquid		
Concentration of substance in pro	oduct	98 %		
Vapour pressure		6 Pa		
Operational conditions		<u> </u>		
Amounts used		Annual site tonnage (tonnes/year):	<= 10000 T	
Frequency and duration of use		Exposure duration	8 h/day	
Other given operational condition	s affecting workers	Dedicated facility	,	
exposure		Assumes activities are at room temperature (15-25°C)		
Risk Management Measures				
Technical conditions and measur	es at process level	Exhaust air scrubber		
	1	1	_1	

Hand protection

suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective

gloves

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(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	u
Organisational measures to prevent /limit rele		
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 shower 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, wea 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
.1.6 Contributing scenario controlling ecovery system)	worker exposure (PROC8b) (Duration: 8 Hours;Concentration	n: 98 %;With LEV;Vapour
	stance or preparation (charging/discharging) from/to vessels/lar	ge containers at dedicated facilities
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 v	orkers Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at proces	s level Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed an sealed	d
Technical conditions and measures to contro dispersion from source towards the worker	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit rele	eases, Workers are fully trained	
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 shower 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 casof insufficient ventilation, wea suitable respiratory
		equipment(EN 141 / EN 405)
	Hand protection	equipment(EN 141 / EN 405) Acid-resistant protective gloves
	Eye protection	equipment(EN 141 / EN 405)  Acid-resistant protective gloves  Chemical goggles or face shield with safety glasses according to EN 166
	<u>'</u>	equipment(EN 141 / EN 405)  Acid-resistant protective gloves  Chemical goggles or face shield with safety glasses
	Eye protection	equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Acid-resistant clothing. Impervious footwear must be worn
ecovery system)	Eye protection  Skin and body protection	equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Acid-resistant clothing. Impervious footwear must be worn  1: 98 %; Without LEV; Vapour
ecovery system)	Eye protection  Skin and body protection  worker exposure (PROC9) (Duration: 8 Hours; Concentration	equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Acid-resistant clothing. Impervious footwear must be worn  1: 98 %; Without LEV; Vapour

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Concentration of substance in product

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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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures	25 6)	
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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	Impervious footwear must be worn. Acid-resistant clothing
2.1.8 Contributing scenario controlling worker ex	posure (PROC13) (Duration: 8 Hours;Concentration: 9	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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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
L	Eye protection	Chemical goggles or face
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ording to Regulation (EC) No. 190	T/2000 (RE/ROTT) WITH Its differen	amont regulation (20) 20 to 000	
			shield with safety glasses according to EN 166
		Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing
2 Contributing scenar	rio controlling environme	ntal exposure (ERC6b)	
ERC6b	Industrial use of reactive p	rocessing aids	
Assessment method	Used EUSES model		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in	n product	98 %	
Vapour pressure		6 hPa	
Operational conditions			
Amounts used		Annual site tonnage (tonnes/year):	<= 10000
Frequency and duration of use	е	Continuous use/release	
Other given operational conditions affecting environmental exposure		Release fraction to air from process :	27.4 kg/day
Risk Management Measures	S		
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 rela plant	ated to sewage treatment	Onsite wastewater treatment required	
'		No discharge of substance into waste water /Municipal STP	
Conditions and measures rela	ated to external treatment	Sewage Sludge incineration / Landfill	
of waste for disposal		No application of sludge to soil	
Conditions and measures related to external recovery of waste		Not required	
B. Exposure estimation	and reference to its	source	
.1. Health			

#### Information for contributing exposure scenar

Information for contributing	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/m³ Long-term: 0.05 mg/m	1 <sup>3</sup>			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	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	0.0000009	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	0.014	0.14	0.014	0.28	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					Long term: ART tool
PROC8a	0.023	0.23	0.023	0.46	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV)					Long term: ART tool
PROC8b	0.00012	0.001	0.0000048	0.0000	Acute: ART tool
(Duration: 8 Hours, Concentration: 98 %, With LEV, Vapour recovery system)				96	Long term: ART tool
PROC9	0.0032	0.032	0.0028	0.056	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV,Vapour recovery system)					Long term: ART tool
PROC13	0.018	0.18	0.016	0.32	Acute: ART tool
(Duration: 8 Hours,Concentration: 98 %,Without LEV)					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	
Guidan	re - Health	Where other Risk Management Measures/Operation

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. in<="" supervision="" td=""></dnel.>
	place to check that the RMMs in place are being used correctly and OCs followed

#### 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< td=""></pnec<>

#### 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

Chemical goggles or face shield with safety glasses according to EN 166

Impervious footwear must be worn. Acid-resistant clothing

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 %)

System, Concentration.	70)				
PROC1	Use in closed process, no	Use in closed process, no likelihood of exposure			
Product characteristic	s				
Physical form of product		Liquid			
Concentration of substa	nce in product	98 %	98 %		
Vapour pressure		6 Pa			
Operational conditions	3				
Amounts used		Annual site tonnage (tonnes/year):	<= 2306 T		
Frequency and duration	of use	Exposure duration	8 h/day		
	conditions affecting workers	Dedicated facility			
exposure		Operation is carried out at elevated temperature (50°C - 150 °C)			
		Emissions source separated from respiratory tracts			
Risk Management Mea	sures				
	d measures at process level	Exhaust air scrubber			
(source) to prevent relea	ase	All pipes, transfers lines and reactor are closed and sealed			
Technical conditions and dispersion from source to		Vapour recovery system. with local exhaust ventilation			
		Workers are in a separate control room			
Organisational measure dispersion and exposure	s to prevent /limit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment		
		Workers are fully trained			
Conditions and measure protection, hygiene and		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		
	ļ-		gioves		

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

Eye protection

PROC2	Use in closed, continuous process with occasional controlled exposure		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in product		98 %	

Skin and body protection

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Frequency and duration of use

Other given operational conditions affecting workers

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Vapour pressure Operational conditions

Amounts used

exposure

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

6 Pa

Annual site tonnage (tonnes/year):

Operation is carried out at elevated temperature

Emissions source separated from respiratory tracts

Exposure duration

(50°C - 150 °C)

<= 2306 T

8 h/day

	Dedicated facility	
	Dedicated facility	
Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and measures to control	Vapour recovery system	
dispersion from source towards the worker	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
Product characteristics	Limid	
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	Dedicated facility	
exposure	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures	·	
Technical conditions and measures at process level	Exhaust air scrubber	
(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	Vapour recovery system. with local exhaust ventilation	
Organisational measures to prevent /limit releases,	Workers are fully trained	
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
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		-	
			of insufficient ventilation, wear suitable respiratory
		Hand protection	equipment(EN 141 / EN 405) Acid-resistant protective
		Eye protection	gloves Chemical goggles or face shield with safety glasses according to EN 166
		Skin and body protection	Acid-resistant clothing. Impervious footwear must be worn
.1.4 Contributing scenario co ecovery system)	ntrolling worker ex	posure (PROC9) (Duration: 8 Hours;Concentration: 9	
PROC9 Trans	sfer of substance or	preparation into small containers (dedicated filling line, in	cluding weighing)
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in produ	uct	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 a	affecting workers	Dedicated facility	,
exposure	g ze.e	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures			
Technical conditions and measures	at process level	Exhaust air scrubber	
(source) to prevent release	·	All pipes, transfers lines and reactor are closed and	
		sealed	
Technical conditions and measures dispersion from source towards the	worker	Vapour recovery system	
Organisational measures to preven	t /limit releases,	Workers are fully trained	
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	Impervious footwear must be worn. Acid-resistant clothing
		posure (PROC13) (Duration: 8 Hours;Concentration:	98 %;Without LEV;With PRE)
	tment of articles by o	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):	<= 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-	
Diek Menegement Messures		25°C)	
Risk Management Measures Technical conditions and measures	at process level	Exhaust air scrubber	
(source) to prevent release			
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		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
		Eye protection	gloves 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 Contributing scena	rio controlling environme	ental exposure (ERC5)	wom. Acid-resistant clothing
ERC5	_	inclusion into or onto a matrix	
Assessment method	Used EUSES model		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in	n product	98 %	
Vapour pressure		6 hPa	
Operational conditions			
Amounts used		Annual site tonnage (tonnes/year):	2306
Frequency and duration of us	se	Continuous use/release	
Other given operational cond environmental exposure	litions affecting	Release fraction to air from process :	3160 kg/day
Risk Management Measure	es		
Technical conditions and me	asures at process level	Exhaust air scrubber	
(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		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 rel plant	ated to sewage treatment	Onsite wastewater treatment required. No discharge of substance into waste water /Municipal STP	
Conditions and measures rele of waste for disposal	ated to external treatment	Sewage Sludge incineration / Landfill  No application of sludge to soil	
Conditions and measures rel	ated to external recovery	Not required	
	rio controlling anvironme	ental expective (EDC6h)	
ERC6b	Industrial use of reactive		
Assessment method	Used EUSES model	and	
Product characteristics	5554 E55E5 Model		
Physical form of product		Liquid	
Concentration of substance in	n 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 Measure	s	<u>'</u>	
Technical conditions and me		Exhaust air scrubber	
(source) to prevent release		All pipes, transfers lines and reactor are closed and sealed	
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	,		

All pipes, transfers lines and reactor are closed and

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Technical onsite conditions and measures to reduce or	User site assumed to be separate chemical and	
limit discharges, air emissions and releases to soil	foul/rain water and be equipped with a WWTP	
	Waste treatment	
Organisation measures to prevent/limit release from	Neutralizing wastewater before discharge and before	
site	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. No discharge	
plant	of substance into waste water /Municipal STP	
Conditions and measures related to external treatment	Sewage Sludge incineration / Landfill	
of waste for disposal	No application of sludge to soil	
Conditions and measures related to external recovery	Not required	
of waste		

#### 3. Exposure estimation and reference to its source

#### 3.1. Health

Information for contributing exposure scenario			
2.1.1 derma sealed coupling are red	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/m³				
	Long-term: 0.05 mg/m				
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	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, Without LEV, Vapour recovery system, Concentration: 98 %)	0.0000009	0.0000 0092	0.0000009	0.0000 018	Acute: ART tool Long term: ART tool
PROC8b (Duration: 8 Hours,Concentration: 98 %,With LEV,Vapour recovery system)	0.00012	0.001	0.0000048	0.0000 96	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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Health

4.1.

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Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.0000013	0.0025	0.000054	Used EUSES model
Marine water	mg/l	0.0000001	0.00025	0.0000788	Used EUSES model
Freshwater sediment	mg/kg dwt	0.0000011	0.002	0.000058	Used EUSES model
Marine water sediment	mg/kg dwt	0.0000001	0.002	0.0000079	Used EUSES model

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

Guidance - Health	measured exposure level <dnel. adopted,="" and="" are="" at="" being="" check="" conditions="" correctly="" ensure="" equivalent="" followed.="" in="" least="" levels<="" managed="" management="" measures="" ocs="" operational="" other="" place="" risk="" risks="" rmms="" should="" supervision="" th="" that="" the="" then="" to="" used="" users="" where=""></dnel.>
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. adopted,="" are="" at="" conditions="" ensure="" equivalent="" least="" levels<="" managed="" management="" measures="" operational="" other="" risk="" risks="" should="" td="" that="" then="" to="" users="" where=""></pnec.>

#### 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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PROC1

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	Date of issue: 26/05/2014
ES Type: Worker	
Version: 1	

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 %)

Use in closed process, no likelihood of exposure

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	98 %	
Vapour pressure	6 Pa	
Operational conditions		

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

	Not 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			

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		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in	n product	98 %	
Vapour pressure		6 Pa	
Operational conditions			

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Frequency and duration of use

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Amounts used

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

Frequency and duration of use	Exposure duration	o n/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				
	Workers are fully trained	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 cast of insufficient ventilation, wea 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		
ystem;Concentration: 98 %) PROC8b Transfer of substance or	preparation (charging/discharging) from/to vessels/large			
Product characteristics	Limited			
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	Vapour recovery system			
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		

Annual site tonnage (tonnes/year):

Exposure duration

<= 30000

is not essential to wear respiratory equipment. In case of insufficient ventilation, wear

Acid-resistant protective

Chemical goggles or face shield with safety glasses

suitable respiratory equipment(EN 141 / EN 405)

gloves

8 h/day

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Hand protection

Eye protection

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			according to EN 166	
		Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing	
.2 Contributing scena	ario controlling environme	ntal exposure (ERC5)		
ERC5	Industrial use resulting in i	nclusion into or onto a matrix		
Assessment method	Used EUSES model			
Product characteristics				
Physical form of product		Liquid		
Concentration of substance i	n product	98 %		
Vapour pressure		6 hPa		
Operational conditions				
Amounts used		Annual site tonnage (tonnes/year):	30000	
Frequency and duration of us	se	Continuous use/release		
Other given operational concentric environmental exposure	litions affecting	Release fraction to air from process :	<= 5000 kg/day	
Risk Management Measure	es			
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		
0 1111		Workers are fully trained		
Conditions and measures rel plant	ated to sewage treatment	Onsite wastewater treatment required	Neutralizing wastewater before discharge and before treatment plant (pH between and 9)	
		No discharge of substance into waste water /Municipal STP		
		No application of sludge to soil		
Conditions and measures rel	ated to external treatment	Sewage Sludge incineration / Landfill		
of waste for disposal		No application of sludge to soil		
Conditions and measures re of waste	lated to external recovery	Not required		
Exposure estimation	n and reference to its	source	-	

### 3.1. Health

Information for contributing	g 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/m³ Long-term: 0.05 mg/	m³			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1	0	0.0000	0	0.0000	Acute: ART tool
(Duration: 8 Hours,With LEV,Vapour recovery system,Concentration: 98 %)		0009		0019	Long term: ART tool
PROC2	0.00000009	0.000	0.00000009	0.000	Acute: ART tool
(Duration: 8 Hours,Vapour recovery system,Concentration: 98 %)					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			Long term: ART tool
system, Concentration:			
98 %)			

#### 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. in<="" supervision="" td=""></dnel.>
	place to check that the RMMs in place are being used correctly and OCs followed

#### 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< td=""></pnec<>

#### 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
Additional good practice advice	Do not cat, drink or smoke during use. Wash hards and other exposed areas with hills soap and water
	before eating, drinking or smoking and when leaving work. Comply with the safety procedures
	before eating, drinking of 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	Date of issue: 26/05/2014
ES Type: Worker	
Version: 1	

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	OC2 Use in closed, continuous process with occasional controlled exposure				
Product characteristics					
Physical form of product		Liquid			
Concentration of substance i	n product	98 %			
Vapour pressure		6 Pa			
Operational conditions					
Amounts used		Annual site tonnage (tonnes/year):	<= 2500 T		
Frequency and duration of us	se	Exposure duration	8 h/day		
Other given operational cond exposure	itions affecting workers	Assumes activities are at room temperature (15-25°C)			
Risk Management Measure	es				
Technical conditions and me (source) to prevent release	asures at process level	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 %)

3 (				
PROC3	Use in closed batch process (synthesis or formulation)			
Product characteristics				
Physical form of product Liquid				
Concentration of substance in product 98 %				
Vapour pressure	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
	Eye protection	gloves 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 ex	posure (PROC4) (Duration: 8 Hours;With LEV;Concer	etration: 98 %)
PROC4 Use in batch and other pr	rocess (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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		osure (PROC9) (Duration: 8 Hours; With LEV; Concent	,
PROC9 Transfer	of substance or p	reparation into small containers (dedicated filling line, inc	cluding 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 affect exposure	cting workers	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures			
Technical conditions and measures at p (source) to prevent release	process level	All pipes, transfers lines and reactor are closed and sealed	
		Exhaust air scrubber	
Technical conditions and measures to dispersion from source towards the wor		with local exhaust ventilation	
Organisational measures to prevent /lin dispersion and exposure	nit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment
		Workers are fully trained	
Conditions and measures related to per 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, wea 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 Contributing scenario contro	lling environme	ntal exposure (ERC2)	
ERC2 Formulat	ion of preparation	IS	
	SES model		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in product		98 %	
Vapour pressure		6 hPa	
		Olira	
Operational conditions		A constraint and the second second	0500
Amounts used		Annual site tonnage (tonnes/year):	2500
Frequency and duration of use Other given operational conditions affect	cting	Continuous use/release  Release fraction to air from process :	12500 kg/day
environmental exposure  Risk Management Measures			
Technical conditions and measures at p	process level	Exhaust air scrubber	
(source) to prevent release		All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measur limit discharges, air emissions and release		User site assumed to be separate chemical and foul/rain water and be equipped with a WWTP  Waste treatment	
Organisation measures to prevent/limit site	release from	Neutralizing wastewater before discharge and before treatment plant (pH between 6 and 9) Ensure procedures and training for emergency	
Conditions and measures related to sev	vage treatment	decontamination and disposal are in place Onsite wastewater treatment required	
plant		No discharge of substance into waste water /Municipal STP	

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Conditions and measures related to external treatment of waste for disposal  Conditions and measures related to external recovery of waste		Sewage Sludge incineration / Landfill	
		No application of sludge to soil	
		Not required	
2.2 Contributing scen	ario controlling environme	ntal exposure (ERC5)	
ERC5	Industrial use resulting in i	nclusion 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 u	ıse	Continuous use/release	
Other given operational conditions affecting environmental exposure		Release fraction to air from process :	12.5 kg/day
Risk Management Measur	es		
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 re	elated to external treatment	Sewage Sludge incineration / Landfill	
of waste for disposal		No application of sludge to soil	
Conditions and measures related to external recovery of waste		Not required	

Information for contributing	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/m³	Acute: 0.1 mg/m³					
	Long-term: 0.05 mg/m	3					
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method		
PROC2	0.0016	0.016	0.0014	0.028	Acute: ART tool		
(Duration: 8 Hours,With LEV,Concentration: 98 %)					Long term: ART tool		
PROC3	0.016	0.16	0.014	0.28	Acute: ART tool		
(Duration: 8 Hours,With LEV,Concentration: 98 %)					Long term: ART tool		
PROC4	0.0014	0.014	0.0012	0.024	Acute: ART tool		
(Duration: 8 Hours,With LEV,Concentration: 98 %)					Long term: ART tool		
PROC9	0.0014	0.014	0.0012	0.024	Acute: ART tool		

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

#### 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. are="" being="" check="" in="" place="" rmms="" supervision="" th="" that="" the="" to="" used<=""></dnel.>
	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

#### 4.2. Environment

Guidance - Environment	measured exposure level <pnec. are="" being="" check="" in="" place="" rmms="" supervision="" th="" that="" the="" to="" used<=""></pnec.>
	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

#### 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 SE9

**Battery maintenance - Sulfuric acid** 

		Version: 1	
Use descriptors	F	U22 ROC19 C0 RC8b, ERC9b	
Processes, tasks, activities c		dustrial use	
Assessment method		RT tool	
		orst case assumption	
. Operational conditio	ns and risk mana	gement measures	
		exposure (PROC19) (Duration: 8 Hours;Concen	tration: 98 %)
PROC19	Hand-mixing with intir	ate contact and only PPE available	
Product characteristics			
Physical form of product		Liquid	
Concentration of substance is	n product	98 %	
Vapour pressure		6 Pa	
Operational conditions			
Amounts used		Annual site tonnage (tonnes/year):	<= 2500 T
Frequency and duration of us	se	Exposure duration	8 h/day
Other given operational cond exposure	litions affecting workers	Assumes activities are at room temperature ( 25°C)	(15-
Risk Management Measure	es		
Technical conditions and me (source) to prevent release	asures at process level	All pipes, transfers lines and reactor are close sealed	ed and
Organisational measures to particular dispersion and exposure	prevent /limit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures rel protection, hygiene and healt		Emergency eye wash fountains and safety sl should be available in the immediate vicinity potential exposure	nowers
		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 Contributing scena	rio controlling enviro	mental exposure (ERC8b)	
ERC8b	-	r use of reactive substances in open systems	
Assessment method	Used EUSES model		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in	n product	98 %	
Vapour pressure		6 hPa	
Operational conditions			
Operational conditions		Annual site tennage /tennagh/segri	2500
Amounto used		Annual site tonnage (tonnes/year):	2500
Amounts used		0	
Amounts used Frequency and duration of us Other given operational cond		Continuous use/release  Release fraction to air from process :	< 34.2 kg/day

ES Ref.: SE9

ES Type: Worker

Date of issue: 26/05/2014

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Risk Management Measures		
Technical conditions and measures at process level	Exhaust air scrubber	
(source) to prevent release	All pipes, transfers lines and reactor are closed and sealed	
Technical onsite conditions and measures to reduce or	User site assumed to be separate chemical and	
limit discharges, air emissions and releases to soil	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 environme		
·	ise 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	Exhaust air scrubber	
(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	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)	
Conditions and measures related to sewage treatment	Ensure procedures and training for emergency decontamination and disposal are in place  No discharge of substance into waste water	
plant  Conditions and measures related to external treatment	/Municipal STP  Not applicable	
of waste for disposal		
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		
	e approach used to conclude safe use,Special connecting	g systems are in place to reduce the
levels of gaseous emissions coupling/uncoupling system	s,All pipes, transfers lines and reactor are closed and sea s and targeted purging systems may be used where largor receive the training and the certification to respect the pro	led,Specialised tanker e volumes and high concentrations

Local - Inhalation					
DNEL	Acute: 0.1 mg/m <sup>3</sup>				
	Long-term: 0.05 mg/m	3			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC19	0.0023	0.023	0.002	0.04	Acute: ART tool
(Duration: 8					Long term: ART tool

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Hours,Concentration: 98 %)			
•			

#### 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. in<="" supervision="" td=""></dnel.>
	place to check that the RMMs in place are being used correctly and OCs followed

#### 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< td=""></pnec<>

#### 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

PROC2

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

#### 1. Exposure scenario SE10

#### Recycling of lead acid batteries - Sulfuric acid

Date of issue: 26/05/2014	ES Ref.: SE10
	EO. T W I
	ES Type: Worker
	Version: 1

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

#### Contributing scenario controlling worker exposure (PROC2) (Duration: 8 Hours; With LEV; Concentration: 25% - 40%) Use in closed, continuous process with occasional controlled exposure

	,	•			
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 condition exposure	ons affecting workers	Assumes activities are at room temperature (15-25°C)			
Risk Management Measures					
Technical conditions and meas (source) to prevent release	ures at process level	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		

#### 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				
Product characteristics 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		
Other given operational conditions affecting workers		Exposure duration	8 h/day		
		Assumes activities are at room temperature (15-25°C)			

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**Risk Management Measures** 

Technical conditions and measures at process level

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Technical conditions and measures at process level (source) to prevent release		All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and meas		with local exhaust ventilation	
dispersion from source towards			
Organisational measures to pre dispersion and exposure		Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures relate protection, hygiene and health e		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
.1.3 Contributing scenario	controlling worker ex	posure (PROC5) (Duration: 8 Hours; With LEV; Concer	itration: 25% - 40%)
		ch processes for formulation of preparations and articles	<u>'</u>
С	contact)		
Product characteristics			
Physical form of product		Liquid	
Concentration of substance in p	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 condition exposure	ons affecting workers	Assumes activities are at room temperature (15-25°C)	
Risk Management Measures			
Technical conditions and meas (source) to prevent release	ures at process level	All pipes, transfers lines and reactor are closed and sealed	
Technical conditions and meas dispersion from source towards	the worker	with local exhaust ventilation	
Organisational measures to predispersion and exposure	event /limit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment
Conditions and measures relate protection, hygiene and health e	•	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, wea 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
.1.4 Contributing scenario	o controlling worker ex	posure (PROC8a) (Duration: 8 Hours;With LEV;Conce	ntration: 25% - 40%)
	ransfer of substance or acilities	preparation (charging/discharging) from/to vessels/large	containers at non dedicated
Product characteristics			
Physical form of product		Liquid	

All pipes, transfers lines and reactor are closed and

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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 u	se	Exposure duration	8 h/day		
Other given operational conceptosure	litions affecting workers	Assumes activities are at room temperature (15-25°C)			
Risk Management Measure	es				
Technical conditions and me (source) to prevent release	easures at process level	All pipes, transfers lines and reactor are closed and sealed			
Technical conditions and me dispersion from source towa		with local exhaust ventilation			
Organisational measures to dispersion and exposure	prevent /limit releases,	Personal protective equipment	Familiarize personnel with proper use of protection equipment		
Conditions and measures re protection, hygiene and heal		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)  Acid-resistant protective		
		Hand protection	aloves		
		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 scena	ario controlling environme	ntal exposure (ERC1)			
ERC1	Manufacture of substance	S			
Assessment method	Used EUSES model				
Product characteristics					
Physical form of product		Liquid			
Concentration of substance	in product	25% - 40%			
Vapour pressure	<u> </u>	6 hPa			
Operational conditions					
Amounts used		Annual site tonnage (tonnes/year):	2500		
Frequency and duration of u	se	Continuous use/release			
Other given operational condensition environmental exposure	ditions affecting	Release fraction to air from process :	34.2 kg/day		
Risk Management Measure	es				
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 re of waste for disposal	lated to external treatment	Sewage Sludge incineration / Landfill			
Conditions and measures re of waste	·	Not required			
3. Exposure estimation	n and reference to its	source			

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#### 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	ocal - Inhalation					
DNEL	Acute: 0.1 mg/m³					
	Long-term: 0.05 mg/	m³				
Contributing Scenario	Acute mg/m³	RCR	RCR Long term mg/m³		Assessment method	
PROC2	0.0014	0.014	0.0012	0.024	Acute: ART tool	
(Duration: 8 Hours,With LEV,Concentration: 25% - 40%)					Long term: ART tool	
PROC4	0.0046	0.046	0.004	0.08	Acute: ART tool	
(Duration: 8 Hours,With LEV,Concentration: 25% - 40%)					Long term: ART tool	
PROC5	0.015	0.15	0.013	0.26	Acute: ART tool	
(Duration: 8 Hours,With LEV,Concentration: 25% - 40%)					Long term: ART tool	
PROC8a	0.0069	0.069	0.006	0.12	Acute: ART tool	
(Duration: 8 Hours, With LEV, Concentration: 25% - 40%)					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. are<="" conditions="" management="" measures="" operational="" other="" risk="" th="" where=""></dnel.>
	adopted, then users should ensure that risks are managed to at least equivalent levels
	<u> </u>

#### 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< td=""></pnec<>

#### 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 SE11

Laboratory chemica	ls - Sulfuric a	cid		ES Ref.: SE11	Date of issue: 26/05/201	
				ES Type: Worker		
				Version: 1		
Lloo doporintoro		SU22				
Use descriptors		PROC15				
		PC21				
		ERC8a, E	RC8h			
Processes, tasks, activities co	overed	Profession				
Assessment method		ART tool				
, , , , , , , , , , , , , , , , , , , ,		Worst cas	se assur	nption		
2. Operational conditio	ns and risk ma	nagemen	nt mea	sures		
				DC15) (Duration: 8 Hours;Concentrati	on: 98 %:With LEV)	
PROC15	Use as laboratory		(			
Product characteristics						
Physical form of product		Lic	quid			
Concentration of substance in	n product	98	3 %			
Vapour pressure	•	61	Pa			
Operational conditions						
Amounts used		Ar	nnual sit	e tonnage (tonnes/year):	<= 5000 T	
Frequency and duration of us	e			duration	8 h/day	
Other given operational cond exposure	itions affecting work		ssumes 5°C)	activities are at room temperature (15-		
Risk Management Measure	S					
Technical conditions and mea	asures to control	wi	with local exhaust ventilation			
dispersion from source towar	ds the worker	Su	uction h	pod	Exhaust gas must be neutralised	
Organisational measures to particular dispersion and exposure	orevent /limit release	es, Pe	ersonal protective equipment		Familiarize personnel with proper use of protection equipment	
				are fully trained		
Conditions and measures rela protection, hygiene and healt		sh	nould be	cy eye wash fountains and safety showe available in the immediate vicinity of an exposure		
				equipment	If the ventilation is suitable, it is not essential to wear respiratory equipment. In case of insufficient ventilation, wea suitable respiratory equipment(EN 141 / EN 405)	
•		Ha	and prot	ection	Acid-resistant protective gloves	
		Ey	ye prote	ction	Chemical goggles or face shield with safety glasses according to EN 166	
		Sk	kin and I	pody protection	Impervious footwear must be worn. Acid-resistant clothing	
2.2.1 Contributing scena	rio controlling env	rironmental	exposu	re (ERC8a)		
ERC8a				ing aids in open systems		
Assessment method	Used EUSES mod	del				
Product characteristics						
Physical form of product	Physical form of product		quid			
Concentration of substance in	n product		98 %			
Vapour pressure	-		6 hPa			
Operational conditions	• •					
Amounts used		Ar	nnual sit	al site tonnage (tonnes/year): 5000		
Frequency and duration of us	ie			is use/release		
Other given operational cond			door use			
<u> </u>						

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#### Safety Data Sheet

Environmental exposure

Unit

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
Risk Management Measu	ıres					
Technical onsite conditions		or W	/aste treatment			
			uction hood			Exhaust gas must be neutralised
Organisation measures to prevent/limit release from site			orkers are fully train	ed		
Conditions and measures related to sewage treatment plant			nsite wastewater trea	atment required		
Conditions and measures related to external treatment of waste for disposal			ot applicable			
Conditions and measures of waste	s and measures related to external recovery					
.2.2 Contributing sce	nario controlling enviror	nmental	exposure (ERC8b)			
ERC8b	Wide dispersive indoo		. ,	in open system	s	
Assessment method	Used EUSES model	, u3C UI	TOUCHIVE SUBSTAILLES	open system		
	OSEG EOSES MOGEL					
Product characteristics		1.				
Physical form of product			iquid			
Concentration of substanc	e in product		8 %			
Vapour pressure		6	hPa			
Operational conditions						
Amounts used		A	nnual site tonnage (t	onnes/year):		5000
Frequency and duration of	use	С	ontinuous use/releas	е		
Other given operational co	onditions affecting	In	ndoor use			
environmental exposure			Release fraction to air from process :			<= 1370 kg/day
Risk Management Measu	ıres					
Technical onsite conditions and measures to reduce or		or W	/aste treatment			
limit discharges, air emissions and releases to soil			uction 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 of waste for disposal	related to external treatme	ent N	ot applicable			
Conditions and measures related to external recovery of waste			ot required			
. Exposure estimation	on and reference to	its so	urce			
1. Health						
Information for contributing				-		
2.1	sealed,Special connecti coupling/uncoupling sys	ng syste stems ar ust rece	ems are in place to re nd targeted purging s vive the training and t	duce the levels ystems may be	of gaseous emi	s lines and reactor are closed a ssions,Specialised tanker le volumes and high concentrati ocedure in order to use correctl
Local - Inhalation						
DNEL	Acute: 0.1 mg/m³					
DIAFF	1					
Contributing Consider	Long-term: 0.05 mg/m³	DCD	Long torre	l DOD	Λοοος	nathad
Contributing Scenario	mg/m³	RCR	Long term mg/m³	RCR	Assessment r	
PROC15 (Duration: 8 Hours,Concentration: 98 %,With LEV)	0.00027	0.003	0.00023	0.005	Acute: ART to Long term: AF	

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PNEC

RCR

Assessment method

Exposure estimation

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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. are="" being="" check="" in="" place="" rmms="" supervision="" td="" that="" the="" to="" used<=""></dnel.>
	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

#### 4.2. Environment

Guidance - Environment	measured exposure level <pnec. are="" being="" check="" in="" place="" rmms="" supervision="" th="" that="" the="" to="" used<=""></pnec.>
	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

#### 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	d areas with mild soan and water
before eating, drinking or smoking and when leaving work. Comply with	n the safety procedures

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#### 1. Exposure scenario SE12

Industrial cleaner - Sulfuric acid

PC35 ERC8a, Processes, tasks, activities covered Industria Assessment method ART tool Worst ca  2. Operational conditions and risk manageme 2.1.1 Contributing scenario controlling worker expose PROC2 Use in closed, continuous pro Product characteristics Physical form of product Concentration of substance in product 1 Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  RECONSTRUCTOR  ART tool Worst ca  ART tool Worst ca  2.1.1 Contributing scenario controlling worker exposure  Exposure  ART tool Worst ca  ART tool Worst ca  2.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributing scenario controlling worker exposure  ART tool Worst ca  2.1.2 Contributions processes  ART tool Wor	al use ol ase assumption	
PROC2, PC35 ERC8a, Processes, tasks, activities covered Industria Assessment method ART tool Worst ca  2. Operational conditions and risk manageme 2.1.1 Contributing scenario controlling worker expositions are product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  PROC2 Industria	ERC8b al use bl ase assumption ent measures sure (PROC2) (Duration: 8 Hours; Concentration: 10	
PC35 ERC8a, Processes, tasks, activities covered Industria Assessment method ART tool Worst ca  2. Operational conditions and risk managemee 2.1.1 Contributing scenario controlling worker expose PROC2 Use in closed, continuous processor product characteristics Physical form of product Concentration of substance in product 1 Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  PC35 ERC8a, PC84  ART tool Worst ca  2.1.1 Contributing scenario controlling worker exposure  E 6  Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  PC4  Conditions and measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  RC5  PC35  ART tool Worst ca  2.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.2.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributing scenario controlling worker exposure  ART tool Worst ca  2.3.1.1 Contributi	ERC8b al use bl ase assumption ent measures sure (PROC2) (Duration: 8 Hours; Concentration: 10	
Processes, tasks, activities covered  Assessment method  ART tool Worst ca  2. Operational conditions and risk managemee  2.1.1 Contributing scenario controlling worker expose PROC2 Use in closed, continuous processory  Product characteristics Physical form of product Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  ERC8a,  Industria  ART tool  Worst ca  ART tool  Worst ca  2.1.1 Contributing scenario controlling worker exposure  Exposure  ART tool  Worst ca  ART tool  Worst ca  2.1.1 Contributing scenario controlling worker exposure  ART tool  Worst ca  2.1.2 Continuous processory  Are in closed, continuous processory  Are product characteristics  Physical form of product  1.2 Concentration of substance in product  1.3 Concentration of substance in product  1.4 Concentration of substance in product  1.5 Concentration of substance in product  1.6 Concentration of substance in product  1.7 Concentration of substance in product  1.8 Concentration of substance in product  1.9 Concentration of substance in product  1.0 Concentration of substance in product  1.1 Contributing scenario controlling worker exposure  2.1 Concentration of substance in product  1.7 Concentration of substance in product  1.8 Concentration of substance in product  1.9 Concentration of substance in product  1.0 Concentration of substance in product  1.7 Concentration of substance in product  1.8 Concentration of substance in product  1.7 Concentration of substance in product  1.8 Concentration of substance in product  1.9 Concentration of substance in product  1.0 Concentration of substance in product  1.1 Concentration of substance in	al use ol ease assumption ent measures eure (PROC2) (Duration: 8 Hours; Concentration: 10	
Processes, tasks, activities covered  Assessment method  ART tool Worst ca  2. Operational conditions and risk management 2.1.1 Contributing scenario controlling worker exposed PROC2 Use in closed, continuous procedure to product characteristics Physical form of product Concentration of substance in product Vapour pressure  Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  RISK Management Measures Fooditions and measures related to personal protection, hygiene and health evaluation	al use ol ease assumption ent measures eure (PROC2) (Duration: 8 Hours; Concentration: 10	
Assessment method  2. Operational conditions and risk manageme 2.1.1 Contributing scenario controlling worker expose PROC2 Use in closed, continuous processory Product characteristics Physical form of product Concentration of substance in product Vapour pressure  Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation  ART tool Worst car Worst car  ART tool Worst car  2.1.1  Contributing scenario controlling worker exposure  A  A  A  A  A  A  Frequency and duration of use  Other given operational conditions affecting workers exposure  A  Conditions and measures to control dispersion from source towards the worker  Organisational measures related to personal protection, hygiene and health evaluation  A  Conditions and measures related to personal protection, hygiene and health evaluation	ent measures sure (PROC2) (Duration: 8 Hours; Concentration: 10	
2. Operational conditions and risk manageme 2.1.1 Contributing scenario controlling worker expositions PROC2 Use in closed, continuous property of the product characteristics Physical form of product Concentration of substance in product Vapour pressure Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	ent measures sure (PROC2) (Duration: 8 Hours;Concentration: 10	
2. Operational conditions and risk manageme 2.1.1 Contributing scenario controlling worker expose PROC2 Use in closed, continuous pro Product characteristics Physical form of product Concentration of substance in product 1 Vapour pressure 6 Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	ent measures sure (PROC2) (Duration: 8 Hours;Concentration: 10	
PROC2  Use in closed, continuous pro  Product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	sure (PROC2) (Duration: 8 Hours;Concentration: 10	
PROC2  Product characteristics  Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation		0/ 10/1/1 1 991/1 1
Product characteristics  Physical form of product Concentration of substance in product 1 Vapour pressure 6 Operational conditions Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure Risk Management Measures Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	ocess with occasional controlled exposure	%;With LEV;Indoor use)
Physical form of product  Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation		
Concentration of substance in product  Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation		
Vapour pressure  Operational conditions  Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	_iquid	
Operational conditions  Amounts used Frequency and duration of use Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	10 %	
Amounts used  Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	6 Pa	
Frequency and duration of use  Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation		
Other given operational conditions affecting workers exposure  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  Conditions and measures related to personal protection, hygiene and health evaluation	Annual site tonnage (tonnes/year):	<= 5000 T
exposure 2  Risk Management Measures  Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  V  Conditions and measures related to personal protection, hygiene and health evaluation	Exposure duration	8 h/day
Technical conditions and measures to control dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  V  Conditions and measures related to personal protection, hygiene and health evaluation	Assumes activities are at room temperature (15- 25°C)	
dispersion from source towards the worker  Organisational measures to prevent /limit releases, dispersion and exposure  V  Conditions and measures related to personal protection, hygiene and health evaluation		
Conditions and measures related to personal protection, hygiene and health evaluation	with local exhaust ventilation	
Conditions and measures related to personal protection, hygiene and health evaluation s	Personal protective equipment	Familiarize personnel with proper use of protection equipment
protection, hygiene and health evaluation s	Norkers are fully trained	
E	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)
F	Hand protection	Acid-resistant protective gloves
E	Eye protection	Chemical goggles or face shield with safety glasses according to EN 166
S	Skin and body protection	Impervious footwear must be worn. Acid-resistant clothing
2.1.2 Contributing scenario controlling worker expose	sure (PROC5) (Duration: 8 Hours;Concentration: 10	%;With LEV;Indoor use)
PROC5 Mixing or blending in batch procontact)	processes for formulation of preparations and articles (	multistage and/or significant
Product characteristics		
Physical form of product L	_iquid	
Concentration of substance in product 1	10 %	
Vapour pressure 6	3 Pa	
Operational conditions		
Amounts used A	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration 8 h/day	
Other given operational conditions affecting workers exposure 2		

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**Risk Management Measures** 

Concentration of substance in product

Vapour pressure

Operational conditions

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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, wea 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 e.	xposure (PROC8a) (Duration: 8 Hours;Concentration:		
3 · · · · · · · · · · · · · · · · · · ·	r preparation (charging/discharging) from/to vessels/large		
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, wea 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	
.1.4 Contributing scenario controlling worker ex	xposure (PROC8b) (Duration: 8 Hours;Concentration:	10 %;Indoor use;Without LEV)	
PROC8b Transfer of substance or	r preparation (charging/discharging) from/to vessels/large	containers at dedicated facilities	
Product characteristics			
Physical form of product	Liquid		
Concentration of substance in product	10.0%		

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10 %

6 Pa

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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	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
14.5 Contribution according to the William	PROCES (PROCES) (Promotions of the control of the c	worn. Acid-resistant clothing
	exposure (PROC9) (Duration: 8 Hours;Concentration: 10	
	or preparation into small containers (dedicated filling line, in	ciuaing weigning)
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	
	should be available in the immediate vicinity of any	of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)
	should be available in the immediate vicinity of any potential exposure	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)  Acid-resistant protective gloves
	should be available in the immediate vicinity of any potential exposure  Breathing equipment	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)  Acid-resistant protective gloves  Chemical goggles or face shield with safety glasses
	should be available in the immediate vicinity of any potential exposure Breathing equipment  Hand protection	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405)  Acid-resistant protective gloves  Chemical goggles or face
protection, hygiene and health evaluation  2.1.6 Contributing scenario controlling worker	should be available in the immediate vicinity of any potential exposure Breathing equipment  Hand protection  Eye protection	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing
protection, hygiene and health evaluation  2.1.6 Contributing scenario controlling worker (EV; With PRE)	should be available in the immediate vicinity of any potential exposure Breathing equipment  Hand protection  Eye protection  Skin and body protection  exposure (PROC10) (Duration: 8 Hours; Concentration: 4	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing
protection, hygiene and health evaluation  2.1.6 Contributing scenario controlling worker (EV; With PRE)	should be available in the immediate vicinity of any potential exposure Breathing equipment  Hand protection  Eye protection  Skin and body protection  exposure (PROC10) (Duration: 8 Hours; Concentration: 4	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing
.1.6 Contributing scenario controlling worker (EV;With PRE)  PROC10 Roller application or bro	should be available in the immediate vicinity of any potential exposure Breathing equipment  Hand protection  Eye protection  Skin and body protection  exposure (PROC10) (Duration: 8 Hours; Concentration: 4	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing
protection, hygiene and health evaluation  2.1.6 Contributing scenario controlling worker (EV; With PRE)  PROC10 Roller application or brouct characteristics  Physical form of product	should be available in the immediate vicinity of any potential exposure  Breathing equipment  Hand protection  Eye protection  Skin and body protection  exposure (PROC10) (Duration: 8 Hours; Concentration: 4 ushing	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing
2.1.6 Contributing scenario controlling worker (EV;With PRE) PROC10 Roller application or brown Product characteristics	should be available in the immediate vicinity of any potential exposure  Breathing equipment  Hand protection  Eye protection  Skin and body protection  exposure (PROC10) (Duration: 8 Hours; Concentration: 4 ushing  Liquid	is not essential to wear respiratory equipment. In case of insufficient ventilation, wear suitable respiratory equipment(EN 141 / EN 405) Acid-resistant protective gloves Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be worn. Acid-resistant clothing

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bording to regulation (EO) No. 1307/2000 (RE/COTI) Wit		1
Amounts used	Annual site tonnage (tonnes/year):	<= 5000 T
Frequency and duration of use	Exposure duration	8 h/day
Other given operational conditions affecting wor exposure	rkers Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Organisational measures to prevent /limit release dispersion and exposure	ses, 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  Skin and body protection	Chemical goggles or face shield with safety glasses according to EN 166 Impervious footwear must be
	Onlin and Body protestion	worn. Acid-resistant clothing
2.1.7 Contributing scenario controlling wo	orker exposure (PROC13) (Duration: 8 Hours;Concentration	: 10 %;Indoor use;Without LEV)
PROC13 Treatment of artic	cles by dipping and pouring	
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 wor exposure	rkers Assumes activities are at room temperature (15-25°C)	
Risk Management Measures		
Organisational measures to prevent /limit release dispersion and exposure	ses, 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 en	vironmental exposure (ERC8a)	
ERC8a Wide dispersive i	indoor use of processing aids in open systems	
Assessment method	odel	
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	10 %	
Vapour pressure	6 hPa	
Operational conditions		
Amounts used		1
	Annual site tonnage (tonnes/year).	↓ 5000
	Annual site tonnage (tonnes/year):  Intermittent release	5000
Frequency and duration of use Other given operational conditions affecting	Annual site tonnage (tonnes/year):  Intermittent release  Indoor use	5000

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environmental expo	sure		Release fraction to air from process :	<= 1370 kg/day	
Risk Management Measures					
Technical onsite conditions and measures to reduce or		and measures to reduce or	Waste treatment		
limit discharges, air emissions and releases to soil		ns and releases to soil	with local exhaust ventilation		
Organisation measures to prevent/limit release from site		revent/limit release from	Workers are fully trained		
Conditions and measures related to sewage treatment plant  Conditions and measures related to external treatment of waste for disposal		elated to sewage treatment	Onsite wastewater treatment required		
		lated to external treatment	Not applicable		
Conditions and mea of waste	asures re	elated to external recovery	Not required		
.2.2 Contributi	ng scen	ario controlling environme	ntal exposure (ERC8b)		
ERC8b		Wide dispersive indoor us	e of reactive substances in open systems		
Assessment metho	d	Used EUSES model			
Product character	istics				
Physical form of pro	oduct		Liquid		
Concentration of su	ıbstance	in product	10 %		
Vapour pressure			6 hPa		
Operational condi	tions				
Amounts used			Annual site tonnage (tonnes/year):	5000	
Frequency and duration of use		se	Intermittent release		
Other given operati		ditions affecting	Indoor use		
environmental exposure			Release fraction to air from process :	<= 1370 kg/day	
Risk Management	Measur	es			
		and measures to reduce or	Waste treatment		
ılmıt discharges, air	emissio	ns and releases to soil	with local exhaust ventilation		
Organisation measures to prevent/limit release from site		revent/limit release from	Workers are fully trained		
Conditions and measures related to sewage treatment plant		elated to sewage treatment	Onsite wastewater treatment required		
Conditions and measures related to external treatment of waste for disposal		lated to external treatment	Not applicable		
Conditions and mea of waste	asures re	elated to external recovery	Not required		
. Exposure est	imatio	n and reference to its	source		
.1. Health					
Information for cont	had be a skiller on				

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/m³	Acute: 0.1 mg/m³				
	Long-term: 0.05 mg/m	Long-term: 0.05 mg/m³				
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method	
PROC2	0.00055	0.006	0.00048	0.010	Acute: ART tool	
(Duration: 8 Hours,Concentration: 10 %,With LEV,Indoor use)					Long term: ART tool	
PROC5	0.061	0.61	0.0027	0.054	Acute: ART tool	
(Duration: 8 Hours,Concentration: 10 %,With LEV,Indoor use)					Long term: ART tool	
PROC8a	0.0055	0.055	0.0048	0.096	Acute: ART tool	
(Duration: 8					Long term: ART tool	

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

#### 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

#### 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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PROC1

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#### 1. Exposure scenario SE13

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

ES Ref.: SE13	Date of issue: 26/05/2014
ES Type: Worker	
Version: 1	

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)

Use in closed process, no likelihood of exposure

		•			
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 measu		with local exhaust ventilation			
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		

## 2.1.2 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)					
Product characteristics	Product characteristics					
Physical form of product		Liquid				
Concentration of substance in product		98 %				
Vapour pressure		6 Pa				
Operational conditions	Operational conditions					
Amounts used		Annual site tonnage (tonnes/year):	<= 300000 T			
Frequency and duration of use		Exposure duration	8 h/day			
Other given operational cond exposure	itions affecting workers	Operation is carried out at elevated temperature (50°C - 150 °C)				

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**Risk Management Measures** 

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Technical conditions and measures to control	with local exhaust ventilation		
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 cas of insufficient ventilation, wea 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	
.1.3 Contributing scenario controlling worker ex	cposure (PROC5) (Duration: 8 Hours;Concentration: 9	8 %;With LEV;Indoor use)	
PROC5 Mixing or blending in bat contact)	ch processes for formulation of preparations and articles	(multistage and/or significant	
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 cas of insufficient ventilation, wea 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 worn. Acid-resistant clothin		
2.1.4 Contributing scenario controlling worker exuse; Vapour recovery system)	xposure (PROC8a) (Duration: 8 Hours;Concentration:	98 %;With LEV;Indoor	
PROC8a Transfer of substance or facilities	preparation (charging/discharging) from/to vessels/large	containers at non dedicated	
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	with local exhaust ventilation	
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 cas of insufficient ventilation, wea 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

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities						
Product characteristics							
Physical form of product		Liquid					
Concentration of substance in product		98 %	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 conditi exposure	ons affecting workers	Assumes activities are at room temperature (15-25°C)					
Risk Management Measures							
Technical conditions and measure		with local exhaust ventilation					
dispersion from source towards	s 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				

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

System, muser use, vital out ELV				
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)			

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Product characteristics		Literatu				
Physical form of product  Concentration of substance in product		Liquid				
·		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 Measure	es					
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 re protection, hygiene and heal		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 casof insufficient ventilation, wea 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 Contributing scena	ario controlling environme	ntal exposure (ERC2)				
ERC2	Formulation of preparation	ns				
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		J ( ==-///-	1 1 1 1			
quoo, and adiation of u	se	Continuous use/release				
		Continuous use/release Indoor use				
Other given operational con-			<= 205 kg/day			
Other given operational con-	ditions affecting	Indoor use	<= 205 kg/day			
Other given operational con- environmental exposure Risk Management Measure	ditions affecting	Indoor use	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions	res easures at process level and measures to reduce or	Indoor use Release fraction to air from process :  All pipes, transfers lines and reactor are closed and	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions	res easures at process level and measures to reduce or	Indoor use Release fraction to air from process :  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions	res easures at process level and measures to reduce or	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to disposal (pH 6 to 9)	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measur  Technical conditions and me (source) to prevent release  Technical onsite conditions limit discharges, air emission  Organisation measures to p	res easures at process level and measures to reduce or ns and releases to soil	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions limit discharges, air emission  Organisation measures to posite  Conditions and measures re	res easures at process level and measures to reduce or ns and releases to soil	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to disposal (pH 6 to 9)  with local exhaust ventilation  Workers are fully trained  Onsite wastewater treatment required	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions limit discharges, air emission  Organisation measures to posite	res easures at process level and measures to reduce or ns and releases to soil	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to disposal (pH 6 to 9)  with local exhaust ventilation  Workers are fully trained  Onsite wastewater treatment required  No discharge of substance into waste water /Municipal STP	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions a limit discharges, air emission  Organisation measures to posite  Conditions and measures re plant	easures at process level and measures to reduce or ns and releases to soil  revent/limit release from	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to disposal (pH 6 to 9)  with local exhaust ventilation  Workers are fully trained  Onsite wastewater treatment required  No discharge of substance into waste water /Municipal STP  No application of sludge to soil	<= 205 kg/day			
Other given operational con- environmental exposure  Risk Management Measure  Technical conditions and me (source) to prevent release  Technical onsite conditions limit discharges, air emission  Organisation measures to posite  Conditions and measures re	easures at process level and measures to reduce or ns and releases to soil  revent/limit release from	Indoor use Release fraction to air from process:  All pipes, transfers lines and reactor are closed and sealed  Waste gas emissions must be scrubbed  Waste treatment  Neutralize contaminated cleaning water prior to disposal (pH 6 to 9)  with local exhaust ventilation  Workers are fully trained  Onsite wastewater treatment required  No discharge of substance into waste water /Municipal STP	<= 205 kg/day			

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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				
	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/m³				
	Long-term: 0.05 mg/n	1 <sup>3</sup>			
Contributing Scenario	Acute mg/m³	RCR	Long term mg/m³	RCR	Assessment method
PROC1 (Duration: 8 Hours, Concentration: 98 %, With LEV, Indoor use, Vapour recovery system)	0	0.0000	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		0.018	Used EUSES model
Marine water	mg/l	0.00000642	0.00025	0.026	Used EUSES model
Freshwater sediment mg/kg dwt 0.000		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. are="" being="" check="" in="" place="" rmms="" supervision="" th="" that="" the="" to="" used<=""></dnel.>
	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
4.2. Environment	
Guidance - Environment	measured exposure level <pnec. adopted,="" and="" are="" at="" being="" check="" conditions="" correctly="" ensure="" equivalent="" followed.="" in="" least="" levels<="" managed="" management="" measures="" ocs="" operational="" other="" place="" risk="" risks="" rmms="" should="" supervision="" td="" that="" the="" then="" to="" used="" users="" where=""></pnec.>

#### 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
	boloro caurig, arrivang or ornotang and when leaving work. Comply with the safety procedures

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