SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Sulphuric acid 15 - 50% (Battery acid 1140-1400 SG)

Version 6.0 Print Date 2012/11/28

Revision date / valid from 2012/11/28 **MSDS code: MSUA104**

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

1.1. Product identifier

Trade name	:	Sulphuric acid 15 - 50% (Battery acid 1140-1400 SG)
Substance name	:	sulphuric acid
Index-No.	:	016-020-00-8
CAS-No.	:	7664-93-9
EC-No.	:	231-639-5
Registration number	:	01-2119458838-20-xxxx

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

Use of the Substance/Mixture	:	Identified use: See table in front of appendix for a complete overview of identified uses.
Uses advised against	:	At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag UK & Ireland Albion House, Rawdon Park GB LS19 7XX Leeds Yeadon
Telephone	:	+44 (0) 113 3879 200
Telefax	:	+44 (0) 113 3879 280
E-mail address	:	msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number	:	Emergency only telephone number (open 24 hours): +44 (0) 1865 407333 (N.C.E.C. Culham)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1A	---	H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	**Risk phrases**
Corrosive (C)	R35

For the full text of the R-phrases mentioned in this Section, see Section 16.

Most important adverse effects

Human Health : See section 11 for toxicological information.

Physical and chemical hazards : See section 9 for physicochemical information.

Potential environmental effects : See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :

Signal word : Danger

Hazard statements :
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statements

Prevention :
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Response :
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.

Storage : P405 Store locked up.

Hazardous components which must be listed on the label:

• sulphuric acid

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)		Classification (67/548/EEC)
		Hazard class / Hazard category	Hazard statements	
sulphuric acid				
Index-No. : 016-020-00-8 CAS-No. : 7664-93-9 EC-No. : 231-639-5 Registration : 01-2119458838-20-xxxx C&L-No. : 02-2119752444-38-0000	>= 15 - < 50	Skin Corr.1A	H314	Corrosive; C; R35

For the full text of the R-phrases mentioned in this Section, see Section 16.
For the full text of the H-Statements mentioned in this Section, see Section 16.

Section 4: First aid measures

4.1. Description of first aid measures

General advice : Take off all contaminated clothing immediately.

If inhaled : In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

In case of skin contact : First swab the concentrated acid with dry pulp or textile; because the acid reacts vigorously with water and with strong evolution of heat. Wash off with plenty of water. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.

If swallowed	: Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

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

Symptoms	: See Section 11 for more detailed information on health effects and symptoms.
Effects	: See Section 11 for more detailed information on health effects and symptoms.

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

Treatment	: Treat symptomatically.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product itself does not burn.
Unsuitable extinguishing media	:	No information available.

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	May decompose in a fire giving off toxic fumes, Hazardous decomposition products, Sulphur oxides, Reacts exothermic with water

5.3. Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.Wear appropriate body protection (full protective suit)
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains.Cool closed containers exposed to fire with water spray.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	: Use personal protective equipment. Provide adequate ventilation. Avoid contact with skin and eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions	: Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. Local authorities should be advised if significant spillages cannot be

contained.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Neutralize with soda and flush with plenty of water. Taking into account local regulations the product may be disposed of as waste water after neutralisation. Clean-up methods - small spillage: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.
Further information	:	Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

Section 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling	:	Keep container tightly closed. Use personal protective equipment. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity. When diluting, always add the product to water. Never add water to the product.
Hygiene measures	:	Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep in an area equipped with acid resistant flooring. Store in original container.
Advice on protection against fire and explosion	:	The product is not flammable. Normal measures for preventive fire protection. Gives off hydrogen by reaction with metals. Risk of explosion.
Further information on storage conditions	:	Keep tightly closed in a dry and cool place. Keep in a well-ventilated place. Product is hygroscopic.
Advice on common storage	:	Keep away from food, drink and animal feedingstuffs. Keep away from combustible material.

7.3. Specific end use(s)

Specific use(s)	:	Identified use: See table in front of appendix for a complete overview of identified uses.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Component:	sulphuric acid	CAS-No. 7664-93-9
Other Occupational Exposure Limit Values		

EU ELV, Time Weighted Average (TWA):, Mist.
0.05 mg/m3
Indicative

EH40 WEL, Time Weighted Average (TWA):
0.05 mg/m3
Mist.
Thoracic fraction.

ELV (IE), Time Weighted Average (TWA):, Mist.
0.05 mg/m3
Indicative OELV

8.2. Exposure controls

Appropriate engineering controls
Refer to protective measures listed in sections 7 and 8.

Personal protective equipment
Respiratory protection

Advice	:	Required if vapours or aerosol are released. Recommended Filter type: Combination filter:E-P2

Hand protection

Advice	:	The glove material has to be impermeable and resistant to the product / the substance / the preparation. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact). Protective gloves should be replaced at first signs of wear. The following materials are suitable:
Material	:	Fluorinated rubber
Break through time	:	>= 8 h
Glove thickness	:	0.5 mm

Material	:	butyl-rubber
Break through time	:	>= 2 h
Glove thickness	:	0.5 mm

Eye protection

Advice	:	Tightly fitting safety goggles

Skin and body protection

Advice	:	Acid resistant protective clothing.

Environmental exposure controls

General advice	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. Local authorities should be advised if significant spillages cannot be contained.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	liquid
Colour	:	colourless or slight coloured
Odour	:	odourless
Odour Threshold	:	no data available
pH	:	ca. 1 (5 g/l; 20 °C)
Solidification point	:	ca. -40 °C
Boiling point/boiling range	:	ca. 120 °C
Flash point	:	not applicable
Evaporation rate	:	no data available
Flammability (solid, gas)	:	The product is not flammable.
Upper explosion limit	:	not applicable
Lower explosion limit	:	not applicable

Vapour pressure	:	no data available
Relative vapor density	:	3.4
Density	:	ca. 1.3 g/cm3 (20 °C)
Water solubility	:	completely miscible
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	not applicable
Thermal decomposition	:	Decomposes on heating.
Viscosity, kinematic	:	no data available
Explosivity	:	Product is not explosive.
Oxidizing properties	:	no data available

9.2. Other information

Molecular Weight	:	98.1 g/mol
Corrosion to metals	:	Corrosive to metals

Section 10: Stability and reactivity

10.1. Reactivity

Advice : No information available.

10.2. Chemical stability

Advice : Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : Gives off hydrogen by reaction with metals. Reacts exothermic with water

10.4. Conditions to avoid

Conditions to avoid : Reacts with the following substances:BasesWater
Thermal decomposition : Decomposes on heating.

10.5. Incompatible materials

Materials to avoid : Organic materials, Bases, Reducing agents, Metals

10.6. Hazardous decomposition products

Hazardous decomposition : Sulphur oxides, Stable under recommended storage conditions.

products

Section 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity
Oral
The substance or mixture is not classified.
Inhalation
The substance or mixture is not classified.
Dermal
The substance or mixture is not classified.

Irritation		
Skin		
Result	:	Very corrosive (rabbit)
Eyes		
Result	:	Very corrosive (rabbit) Risk of serious damage to eyes.

Sensitisation		
Result	:	Did not cause sensitization on laboratory animals.

CMR effects		
CMR Properties		
Carcinogenicity	:	no data available
Mutagenicity	:	no data available
Teratogenicity	:	Did not show teratogenic effects in animal experiments.
Reproductive toxicity	:	Animal testing did not show any effects on fertility.

Specific Target Organ Toxicity
Single exposure

remark	:	The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

remark	:	The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties

Aspiration hazard

No aspiration toxicity classification

Further information

Other relevant toxicity information	:	If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Component:	**sulphuric acid**	**CAS-No. 7664-93-9**

Acute toxicity

Oral

LD50	:	2140 mg/kg (rat)

Section 12: Ecological information

12.1. Toxicity

Component:	**sulphuric acid**	**CAS-No. 7664-93-9**

Acute toxicity

Fish

LC50	:	42 mg/l (Gambusia affinis; 96 h)

Toxicity to daphnia and other aquatic invertebrates

EC50	:	29 mg/l (Daphnia magna; 24 h)

Bacteria

EC50	:	58 mg/l (activated sludge; 120 h)

12.2. Persistence and degradability

Component:	sulphuric acid	CAS-No. 7664-93-9
Persistence and degradability		
Persistence		
Result	:	no data available
Biodegradability		
Result	:	The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Component:	sulphuric acid	CAS-No. 7664-93-9
Bioaccumulation		
Result	:	no data available

12.4. Mobility in soil

Component:	sulphuric acid	CAS-No. 7664-93-9
Mobility		
	:	no data available

12.5. Results of PBT and vPvB assessment

Component:	sulphuric acid	CAS-No. 7664-93-9
Results of PBT and vPvB assessment		
Result	:	not applicable

12.6. Other adverse effects

Additional ecological information

Result	:	Harmful effects to aquatic organisms due to pH-shift. Neutralization is normally necessary before waste water is discharged into water treatment plants. Do not flush into surface water or sanitary sewer system.

Section 13: Disposal considerations

13.1. Waste treatment methods

Product	:	Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
Contaminated packaging	:	Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

Section 14: Transport information

14.1. UN number

2796

14.2. UN proper shipping name

ADR	:	SULPHURIC ACID
RID	:	SULPHURIC ACID
IMDG	:	SULPHURIC ACID

14.3. Transport hazard class(es)

ADR-Class (Labels; Classification Code; Hazard identification No; Tunnel restriction code)	:	8 8; C1; 80; (E)
RID-Class (Labels; Classification Code; Hazard identification No)	:	8 8; C1; 80
IMDG-Class (Labels; EmS)	:	8 8; F-A, S-B

14.4. Packaging group

ADR : II

RID : II
IMDG : II

14.5. Environmental hazards

Labeling according to 5.2.1.8 ADR	: no
Labeling according to 5.2.1.8 RID	: no
Labeling according to 5.2.1.6.3 IMDG	: no
Classification as environmentally hazardous according to 2.9.3 IMDG	: no
Classified as “P” according to 2.10 IMDG	: no

14.6. Special precautions for user

Not applicable.

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

IMDG : Not applicable.

Section 15: Regulatory information

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

:

Notification status

sulphuric acid:

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
INV (CN)	YES	
ENCS (JP)	YES	(1)-430
ISHL (JP)	YES	(1)-430
TSCA	YES	
EINECS	YES	231-639-5
KECI (KR)	YES	97-1-405
KECI (KR)	YES	KE-32570
PICCS (PH)	YES	

15.2. Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

Section 16: Other information

Full text of R-phrases referred to under sections 2 and 3.

R35	Causes severe burns.

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Further information

Other information	:	Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use.The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text

|| Indicates updated section.

Sulphuric acid 15 - 50% (Battery acid 1140-1400 SG)

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Use as an intermediate	3	4, 6b, 8, 9, 14	19	1, 2, 3, 4, 8a, 8b, 9	6a	NA	ES679
2	Formulation & (re)packing of substances and mixtures	3	10	NA	1, 3, 5, 8a, 8b, 9	2	NA	ES689
3	Use in laboratories	22	NA	21	15	8a, 8b	NA	ES906
4	Use for extractions and processing of minerals, ores	3	2a, 14	20, 40	2, 3, 4	4, 6b	NA	ES784
5	Use as processing aid	3	4, 5, 6b, 8, 9, 11, 23	20	1, 2, 3, 4, 8a, 8b, 9, 13	6b	NA	ES782
6	Use in electrolytic processes	3	14, 15, 17	14, 20	1, 2, 8b, 9, 13	5, 6b	NA	ES788
7	Use in the process of surface treatments, purification and etching	3	2a, 14, 15, 16	14, 15	1, 2, 3, 4, 8a, 8b, 9, 13	6b	NA	ES786
8	Use in gas treatment	3	8	20	1, 2, 8b	7	NA	ES790
9	Use in production of sulphuric acid contained batteries	3	NA	NA	2, 3, 4, 9	2, 5	NA	ES792
10	Use in recycling of sulphuric acid contained batteries	3	NA	NA	2, 4, 5, 8a	1	NA	ES794
11	Use in maintenance of sulphuric acid contained batteries	22	NA	NA	19	8b, 9b	NA	ES798

1. Short title of Exposure Scenario 1: Use as an intermediate	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU4: Manufacture of food products SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys
Chemical product category	PC19: Intermediate
Process categories	PROC1: Use in closed process, no likelihood of exposure 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 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)
Environmental Release Categories	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC6a		
Product characteristics	Concentration of the Substance in Mixture/Article	The substance is used up in the process
Amount used	Annual amount per site	300000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Exhaust gases may be treated by scrubbers or emissions may be measured and controlled according to local legislation
	Water	The wastewater neutralisation process is extremely efficient with almost total neutralisation achieved
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9		
Product characteristics	Concentration of the Substance in Mixture/Article	The substance is used up in the process
	Physical Form (at time of use)	liquid

	Vapour pressure	0.06 hPa
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC1, PROC2, PROC8a, PROC8b)	
	Outdoors near to buildings(PROC3, PROC4)	
	Indoors, any sized room, with good natural ventilation(PROC9)	
	Process may involve high temperature (50 - 150°C)(PROC1, PROC2, PROC3, PROC4)	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(except PROC8a)	
	Provide local exhaust ventilation (LEV).(PROC1, PROC3, PROC8b)	
	Complete segregation(PROC1, PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6a	---	Fresh water	PEC	0.2µg/L	0.08
ERC6a	---	Marine water	PEC	0.03µg/L	0.12
ERC6a	---	Fresh water sediment	PEC	0.0018µg/kg	0.0009
ERC6a	---	Marine sediment	PEC	0.0026µg/kg	0.0013
ERC6a	---	Soil	PEC	0.92µg/kg	---
ERC6a	---	Air	PEC	0.0032µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

PROC1	90th percentile value	worker inhalation, long term - systemic	0.0094ng/m3	---
PROC2	90th percentile value	worker inhalation, long term - systemic	0.092ng/m3	---
PROC3	90th percentile value	worker inhalation, long term - systemic	0.42µg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	14µg/m³	---
PROC8a	90th percentile value	worker inhalation, long term - systemic	23µg/m³	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0048µg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	2.8µg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 2: Formulation & (re)packing of substances and mixtures	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) 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)
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	300000 ton(s)/year
	Annual amount used per region	3 Million tonnes/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Exhaust gases may be treated by scrubbers or emissions may be measured and controlled according to local legislation
	Water	The wastewater neutralisation process is extremely efficient with almost total neutralisation achieved
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure considered to be negligible due to the specialized systems.	

Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC1, PROC8a, PROC8b)	
	Outdoors near to buildings(PROC3)	
	Indoors, any sized room, with good natural ventilation(PROC5, PROC9)	
	Process may involve high temperature (50 - 150°C)(PROC1, PROC3)	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(except PROC5)	
	Provide local exhaust ventilation (LEV).(PROC1, PROC3, PROC5, PROC8b)	
	Complete segregation(PROC1)	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0.0443µg/L	0.01772
ERC2	---	Marine water	PEC	0.0064µg/L	0.02568
ERC2	---	Fresh water sediment	PEC	0.0038µg/kg	0.00192
ERC2	---	Marine sediment	PEC	0.0005µg/kg	0.00028
ERC2	---	Soil	PEC	0.2µg/kg	---
ERC2	---	Air	PEC	0.0007µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	90th percentile value	worker inhalation, long term - systemic	0.0009ng/m3	---
PROC3	90th percentile value	worker inhalation, long term - systemic	0.42µg/m³	---

PROC5	90th percentile value	worker inhalation, long term - systemic	0.016mg/m³	---
PROC8a	90th percentile value	worker inhalation, long term - systemic	0.023mg/m³	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0004µg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	0.0028mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 3: Use in laboratories		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Chemical product category	PC21: Laboratory chemicals	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	5000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure considered to be negligible due to the specialized systems.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Indoors, any sized room, with good natural ventilation	
	Due to the nature of the substance the process should be kept as contained as possible	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

and health evaluation	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	PEC	0.138µg/L	0.05520
ERC8a	---	Marine water	PEC	0.0074µg/L	0.02956
ERC8a	---	Fresh water sediment	PEC	0.011µg/kg	0.00580
ERC8a	---	Marine sediment	PEC	0.639ng/kg	0.00032
ERC8a	---	Soil	PEC	0.134µg/kg	---
ERC8a	---	Air	PEC	0.48ng/m3	---
ERC8b	---	Fresh water	PEC	2.12ng/L	0.00085
ERC8b	---	Marine water	PEC	0.0666ng/L	0.00026
ERC8b	---	Fresh water sediment	PEC	0.183ng/kg	0.00009
ERC8b	---	Marine sediment	PEC	0.0058ng/kg	0.00000
ERC8b	---	Soil	PEC	0.134ng/kg	---
ERC8b	---	Air	PEC	0.0048ng/m3	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	90th percentile value	worker inhalation, long term - systemic	0.023µg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 4: Use for extractions and processing of minerals, ores		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU2a: Mining (without offshore industries) SU14: Manufacture of basic metals, including alloys	
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents PC40: Extraction agents	
Process categories	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	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	438 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Metal recovery, incineration or landfill
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC2)	

	Outdoors near to buildings(PROC3, PROC4)
	Process may involve high temperature (50 - 150°C)
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.
	Due to the nature of the substance the process should be kept as contained as possible
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(PROC2, PROC4)
	Provide local exhaust ventilation (LEV).(PROC2)
	Complete segregation(PROC2)
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance
	Substance-handling procedures shall be well documented and strictly supervised
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water	PEC	0.025µg/L	0.01000
ERC4	---	Marine water	PEC	0.0036µg/L	0.01424
ERC4	---	Fresh water sediment	PEC	0.0021µg/kg	0.00106
ERC4	---	Marine sediment	PEC	0.0003µg/kg	0.00015
ERC4	---	Soil	PEC	0.112µg/kg	---
ERC4	---	Air	PEC	0.0004µg/m³	---
ERC6b	---	Fresh water	PEC	0.026ng/L	0.00001
ERC6b	---	Marine water	PEC	0.0037ng/L	0.00001
ERC6b	---	Fresh water sediment	PEC	0.0000µg/kg	0.00000
ERC6b	---	Marine sediment	PEC	0.0000µg/kg	0.00000
ERC6b	---	Soil	PEC	0.0001µg/kg	---
ERC6b	---	Air	PEC	0.0000µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	90th percentile value	worker inhalation, long term - systemic	0.092ng/m3	---
PROC3	90th percentile value	worker inhalation, long term - systemic	0.42µg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	0.014mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 5: Use as processing aid	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	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 SU11: Manufacture of rubber products SU23: Electricity, steam, gas water supply and sewage treatment
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents
Process categories	PROC1: Use in closed process, no likelihood of exposure 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 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) PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	100000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Exhaust gases may be treated by scrubbers or emissions may be measured and controlled according to local legislation
	Water	The wastewater neutralisation process is extremely efficient with almost total neutralisation achieved
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	On-site waste water treatment
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13		
Product characteristics	Concentration of the	Concentration of substance in product: 98%

	Substance in Mixture/Article	
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC1, PROC2, PROC8a, PROC8b)	
	Outdoors near to buildings(PROC3, PROC4)	
	Indoors, any sized room, with good natural ventilation(PROC9, PROC13)	
	Process may involve high temperature (50 - 150°C)(PROC1, PROC2, PROC3, PROC4)	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(except PROC8a, PROC13)	
	Provide local exhaust ventilation (LEV).(PROC1, PROC2, PROC3, PROC8b)	
	Complete segregation(PROC1, PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6b	---	Fresh water	PEC	0.0059µg/L	0.00236
ERC6b	---	Marine water	PEC	0.0009µg/L	0.00344
ERC6b	---	Fresh water sediment	PEC	0.0005µg/kg	0.00026
ERC6b	---	Marine sediment	PEC	0.074ng/kg	0.00004
ERC6b	---	Soil	PEC	0.027µg/kg	---
ERC6b	---	Air	PEC	0.0000µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	90th percentile value	worker inhalation, long term - systemic	0.0094ng/m3	---
PROC2	90th percentile value	worker inhalation, long term - systemic	0.092ng/m3	---
PROC3	90th percentile value	worker inhalation, long term - systemic	0.42µg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	0.014mg/m³	---
PROC8a	90th percentile value	worker inhalation, long term - systemic	0.023mg/m³	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0048µg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	0.0028mg/m³	---
PROC13	90th percentile value	worker inhalation, long term - systemic	0.016mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 6: Use in electrolytic processes	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Chemical product category	PC14: Metal surface treatment products, including galvanic and electroplating products PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure 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) PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC5, ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 95-98%
Amount used	Annual amount per site	2306 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Metal recovery, incineration or landfill

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8b, PROC9, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 95-98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure should be low and controlled	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day

	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC1, PROC2, PROC8a, PROC8b)	
	Indoors, any sized room, with good natural ventilation(PROC9, PROC13)	
	Process may involve high temperature (50 - 150°C)(PROC1, PROC2)	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(except PROC13)	
	Provide local exhaust ventilation (LEV).(PROC1, PROC8b)	
	Complete segregation(PROC1, PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	
	Wear respiratory protection (Efficiency: 90 %)(PROC13)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC5	---	Fresh water	PEC	0.0681µg/L	0.02724
ERC5	---	Marine water	PEC	0.0099µg/L	0.03948
ERC5	---	Fresh water sediment	PEC	0.0059µg/kg	0.00294
ERC5	---	Marine sediment	PEC	0.0008µg/kg	0.00043
ERC5	---	Soil	PEC	0.309µg/kg	---
ERC5	---	Air	PEC	0.0011µg/m³	---
ERC6b	---	Fresh water	PEC	0.136ng/L	0.00005
ERC6b	---	Marine water	PEC	0.0197ng/L	0.00008
ERC6b	---	Fresh water sediment	PEC	0.0118ng/kg	0.00001
ERC6b	---	Marine sediment	PEC	0.0017ng/kg	0.00000
ERC6b	---	Soil	PEC	0.618ng/kg	---
ERC6b	---	Air	PEC	0.0022ng/m3	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	90th percentile value	worker inhalation, long term - systemic	0.0094ng/m3	---

PROC2	90th percentile value	worker inhalation, long term - systemic	0.092ng/m3	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0048µg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	0.0028mg/m³	---
PROC13	90th percentile value	worker inhalation, long term - systemic	0.47mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 7: Use in the process of surface treatments, purification and etching	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU2a: Mining (without offshore industries) 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
Chemical product category	PC14: Metal surface treatment products, including galvanic and electroplating products PC15: Non-metal-surface treatment products
Process categories	PROC1: Use in closed process, no likelihood of exposure 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 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) PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC6b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	10000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure considered to be negligible due to the specialized systems and closed nature of the production process	

Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Outdoors not close to buildings(PROC1, PROC2, PROC8a, PROC8b)	
	Outdoors near to buildings(PROC3, PROC4)	
	Indoors, any sized room, with good natural ventilation(PROC9, PROC13)	
	Process may involve high temperature (50 - 150°C)(PROC1, PROC2, PROC3, PROC4)	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system(except PROC8a, PROC13)	
	Provide local exhaust ventilation (LEV).(PROC1, PROC2, PROC3, PROC8b)	
	Complete segregation(PROC1, PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6b	---	Fresh water	PEC	0.591ng/L	0.00024
ERC6b	---	Marine water	PEC	0.0856ng/L	0.00034
ERC6b	---	Fresh water sediment	PEC	0.051ng/kg	0.00003
ERC6b	---	Marine sediment	PEC	0.0074ng/kg	0.00000
ERC6b	---	Soil	PEC	2.68ng/kg	---
ERC6b	---	Air	PEC	0.0096ng/m3	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	90th percentile value	worker inhalation, long term - systemic	0.0094ng/m3	---
PROC2	90th percentile value	worker inhalation, long	0.0920ng/m3	---

		term - systemic		
PROC3	90th percentile value	worker inhalation, long term - systemic	0.42µg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	0.014mg/m³	---
PROC8a	90th percentile value	worker inhalation, long term - systemic	0.023mg/m³	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0048µg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	0.0028mg/m³	---
PROC13	90th percentile value	worker inhalation, long term - systemic	0.016mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 8: Use in gas treatment		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)	
Chemical product category	PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents	
Process categories	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Environmental Release Categories	ERC7: Industrial use of substances in closed systems	
2.1 Contributing scenario controlling environmental exposure for: ERC7		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	30000 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Spent acid solutions are neutralized to circumneutral pH prior to discharge
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure should be low and controlled	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²

	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases
Other operational conditions affecting workers exposure	Outdoors not close to buildings
	Process may involve high temperature (50 - 150°C)
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.
	Due to the nature of the substance the process should be kept as contained as possible
Technical conditions and measures to control dispersion from source towards the worker	Use vapour recovery system
	Provide local exhaust ventilation (LEV).(PROC1, PROC8b)
	Complete segregation(PROC1, PROC2)
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance
	Substance-handling procedures shall be well documented and strictly supervised
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC7	---	Fresh water	PEC	0.0886µg/L	0.03544
ERC7	---	Marine water	PEC	0.0128µg/L	0.05120
ERC7	---	Fresh water sediment	PEC	0.0076µg/kg	0.00383
ERC7	---	Marine sediment	PEC	0.0011µg/kg	0.00056
ERC7	---	Soil	PEC	0.0029mg/kg	---
ERC7	---	Air	PEC	0.0014µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	90th percentile value	worker inhalation, long term - systemic	0.0094ng/m3	---
PROC2	90th percentile value	worker inhalation, long term - systemic	0.092ng/m3	---
PROC8b	90th percentile value	worker inhalation, long term - systemic	0.0048µg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 9: Use in production of sulphuric acid contained batteries		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	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 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Environmental Release Categories	ERC2: Formulation of preparations ERC5: Industrial use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC5		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
Amount used	Annual amount per site	2500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC9		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 98%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure should be low and controlled	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm^2
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Indoors, any sized room, with good natural ventilation	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Organisational measures to prevent /limit releases, dispersion	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly	

and exposure	supervised
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water	PEC	0.0369µg/L	0.01476
ERC2	---	Marine water	PEC	0.0054µg/L	0.02144
ERC2	---	Fresh water sediment	PEC	0.0032µg/kg	0.00160
ERC2	---	Marine sediment	PEC	0.0005µg/kg	0.00023
ERC2	---	Soil	PEC	0.166µg/kg	---
ERC2	---	Air	PEC	0.0006µg/m³	---
ERC5	---	Fresh water	PEC	0.0788µg/L	0.03152
ERC5	---	Marine water	PEC	0.0107µg/L	0.04280
ERC5	---	Fresh water sediment	PEC	0.0064µg/kg	0.00319
ERC5	---	Marine sediment	PEC	0.0009µg/kg	0.00046
ERC5	---	Soil	PEC	0.335µg/kg	---
ERC5	---	Air	PEC	0.0012µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	90th percentile value	worker inhalation, long term - systemic	1.4µg/m³	---
PROC3	90th percentile value	worker inhalation, long term - systemic	0.014mg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	0.0012mg/m³	---
PROC9	90th percentile value	worker inhalation, long term - systemic	0.0012mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that

risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 10: Use in recycling of sulphuric acid contained batteries		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure 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	
Environmental Release Categories	ERC1: Manufacture of substances	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 25% - 40%
Amount used	Annual amount per site	2500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC4, PROC5, PROC8a		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 25% - 40%
	Physical Form (at time of use)	liquid
	Vapour pressure	0.06 hPa
Amount used	Worker exposure considered to be negligible due to the specialized systems.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Indoors, any sized room, with good natural ventilation	
	Room size and ventilation rate are not relevant as workers work in a control room, with no direct contact to the installations housing the material.	
	Due to the nature of the substance the process should be kept as contained as possible	
Technical conditions and	Provide local exhaust ventilation (LEV).	

measures to control dispersion from source towards the worker	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance
	Substance-handling procedures shall be well documented and strictly supervised
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water	PEC	0.0074µg/L	0.00295
ERC1	---	Marine water	PEC	0.0011µg/L	0.00428
ERC1	---	Fresh water sediment	PEC	0.0638ng/kg	0.00032
ERC1	---	Marine sediment	PEC	0.0093ng/kg	0.00005
ERC1	---	Soil	PEC	0.0335µg/kg	---
ERC1	---	Air	PEC	0.0001µg/m³	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	90th percentile value	worker inhalation, long term - systemic	0.0012mg/m³	---
PROC4	90th percentile value	worker inhalation, long term - systemic	0.004mg/m³	---
PROC5	90th percentile value	worker inhalation, long term - systemic	0.013mg/m³	---
PROC8a	90th percentile value	worker inhalation, long term - systemic	0.006mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario 11: Use in maintenance of sulphuric acid contained batteries		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC9b: Wide dispersive outdoor use of substances in closed systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC9b		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 25% - 40%
Amount used	Annual amount per site	2500 ton(s)/year
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Flow rate of receiving surface water	18,000 m3/d
	Dilution Factor (River)	10
	Dilution Factor (Coastal Areas)	100
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m3/d
	Sludge Treatment	Incineration or in a landfill
2.2 Contributing scenario controlling worker exposure for: PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product: 25% - 40%
	Physical Form (at time of use)	liquid
	Vapour pressure	2.14 hPa
Amount used	Worker exposure considered to be negligible due to the specialized systems.	
Frequency and duration of use	Frequency of use	220 days/year
	Exposure duration per day	480 min
	Intermittent contact is expected	
Human factors not influenced by risk management	Breathing volume	10 m3/day
	Exposed skin surface	480 cm²
	Please note that due to the corrosive nature of the substance dermal exposure is not considered relevant for risk characterization as it must be prevented in all cases	
Other operational conditions affecting workers exposure	Indoors, any sized room, with good natural ventilation	
	Due to the nature of the substance the process should be kept as contained as possible	
Organisational measures to prevent /limit releases, dispersion and exposure	Only properly trained and authorised personal shall handle the substance	
	Substance-handling procedures shall be well documented and strictly supervised	
	Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimize exposure and risks	
Conditions and measures related to personal protection, hygiene and health evaluation	Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, boots and protective coverall)	

3. Exposure estimation and reference to its source

Environment

EUSES V2.1 tier 2

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8b	---	Fresh water	PEC	0.001µg/L	0.00424
ERC8b	---	Marine water	PEC	0.333ng/L	0.00133
ERC8b	---	Fresh water sediment	PEC	0.914ng/kg	0.00046
ERC8b	---	Marine sediment	PEC	0.0288ng/kg	0.00001
ERC8b	---	Soil	PEC	0.671ng/kg	---
ERC8b	---	Air	PEC	0.002ng/m3	---
ERC9b	---	Fresh water	PEC	0.003µg/L	0.01340
ERC9b	---	Marine water	PEC	1.85ng/L	0.00740
ERC9b	---	Fresh water sediment	PEC	2.89ng/kg	0.00140
ERC9b	---	Marine sediment	PEC	0.16ng/kg	0.00008
ERC9b	---	Soil	PEC	0.003µg/kg	---
ERC9b	---	Air	PEC	0.12ng/m3	---

Workers

Advanced REACH Tool (ART model)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
---	90th percentile value	worker inhalation, long term - systemic	0.002mg/m³	---

The ECETOC exposure estimation is considered to be unsatisfactory and is not considered relevant for the risk characterisation purposes

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.