

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

SULPHURIC ACID 51 - <94%

Version 7.3

Print Date 2021/01/29

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MSDS code: MSUL051

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Trade name : SULPHURIC ACID 51 - <94%
Substance name : sulphuric acid
Index-No. : 016-020-00-8
CAS-No. : 7664-93-9
EC-No. : 231-639-5
EU REACH-Reg. No. : 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
Remarks : Before referring to any Exposure Scenario attached to this Safety Data Sheet please check the grade of the product: the Exposure Scenarios presented are not related to all product grade

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK Limited
Alpha House, Lawnswood Business Park
GB LS16 6QY Leeds
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

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| Hazard class | Hazard category | Target Organs | Hazard statements |
|---------------------|-----------------|---------------|-------------------|
| Corrosive to metals | Category 1 | --- | H290 |
| Skin corrosion | Category 1A | --- | H314 |
| Serious eye damage | Category 1 | --- | H318 |

For the full text of the H-Statements 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 9/10 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.

Response : P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

SULPHURIC ACID 51 - <94%**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

| | | Classification (REGULATION (EC) No 1272/2008) | |
|---|--------------|--|-------------------|
| Hazardous components | Amount [%] | Hazard class / Hazard category | Hazard statements |
| sulphuric acid | | | |
| Index-No. : 016-020-00-8 | >= 51 - < 94 | Met. Corr.1 | H290 |
| CAS-No. : 7664-93-9 | | Skin Corr.1A | H314 |
| EC-No. : 231-639-5 | | | |
| EU REACH-Reg. No. : 01-2119458838-20-xxxx | | | |

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 | : Wash off immediately with plenty of water. Call a physician immediately. |
| 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. |

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Protection of First Aid Responders : First Aid responders should pay attention to self-protection and use the recommended protective clothing.

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 : Extremely corrosive and destructive to tissue. If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. 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 : High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : The formation of caustic fumes is possible.

Hazardous combustion products : Sulphur oxides

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)

Specific extinguishing methods : Control smoke with water spray.

Further advice : Cool closed containers exposed to fire with water spray. Heating will cause a pressure rise - with risk of bursting. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

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Personal precautions : Keep away unprotected persons. Use personal protective equipment. Danger of slipping if spilled. Ensure adequate ventilation. Avoid contact with the skin and the 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.

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. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. 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.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store in original container. Keep in an area equipped with acid resistant flooring. Suitable materials for containers: reinforced plastic; Stainless Steel only for the concentrate; Unsuitable materials for containers: Stainless steel for making dilutions or store the diluted product at less than 90%.

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| | |
|---|--|
| Advice on protection against fire and explosion | : Normal measures for preventive fire protection. The product is not flammable. 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 |
|-------------------|-----------------------|--------------------------|

Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)**DNEL**

Workers, Acute - local effects, Inhalation : 0.1 mg/m³

DNEL

Workers, Long-term - local effects, Inhalation : 0.05 mg/m³

Predicted No Effect Concentration (PNEC)

Fresh water : 0.0025 mg/l

Marine water : 0.00025 mg/l

Fresh water sediment : 0.002 mg/kg

Marine sediment : 0.002 mg/kg

Sewage treatment plant (STP) : 8.8 mg/l

Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), as amended, Time Weighted Average (TWA):
0.05 mg/m³

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EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended, Time Weighted Average (TWA):, Mist.
0.05 mg/m³

Indicative

ELV (IE), Time Weighted Average (TWA):

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 : In case of brief exposure or low pollution use breathing filter apparatus.
Respiratory protection complying with EN 141.
Recommended Filter type: BE2P3
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice : Protective gloves complying with EN 374.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.
Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
Protective gloves should be replaced at first signs of wear.

Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

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

Eye protection

Advice : Safety goggles
Face-shield

Skin and body protection

Advice : Impervious clothing

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Chemical resistant apron

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

| | |
|--------------------------------|---|
| Form | : liquid |
| Colour | : colourless |
| Odour | : odourless |
| Odour Threshold | : no data available |
| pH | : -1 - -0.5 (100 %) ((calculated)) |
| Solidification / Setting point | : -33.5 °C 51% solution |
| Melting point/range | -45 °C 70% solution |
| Freezing point | -33 °C 92% solution |
| | -30 °C 94% solution |
| | -11 °C 96% solution |
| Boiling point | : 125 °C 51% solution |
| Boiling point/boiling range | 160 °C 70% solution |
| Boiling point | 276 °C 92% solution |
| | 288 °C 94% solution |
| | 310 °C 98% solution |
| Flash point | : Not applicable |
| Evaporation rate | : no data available |
| Flammability (solid, gas) | : Not applicable |
| Upper explosion limit | : Not applicable |
| Lower explosion limit | : Not applicable |
| Vapour pressure | : < 0.001 hPa (20 °C) |
| Relative vapour density | : no data available |
| Density | : ca. 1.44 g/cm ³ 55% solution |
| | 1.61 g/cm ³ 70% solution |
| | 1.73 g/cm ³ 80% solution |
| | 1.81 g/cm ³ 90% solution |
| | 1.83 g/cm ³ 95% solution |
| Water solubility | : completely soluble |

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| | |
|--|-----------------------------|
| Partition coefficient: n-octanol/water | : no data available |
| Auto-ignition temperature | : Not applicable |
| Thermal decomposition | : no data available |
| Viscosity, dynamic | : ca. 22.5 mPa.s (20 °C) |
| Explosivity | : Product is not explosive. |
| Oxidizing properties | : no data available |

9.2. Other information

| | |
|---------------------|-----------------------|
| Molecular weight | : 98.08 g/mol |
| Corrosion to metals | : Corrosive to metals |

SECTION 10: Stability and reactivity**10.1. Reactivity**

| | |
|--------|---|
| Advice | : No decomposition if stored and applied as directed. Corrosive in contact with metals |
|--------|---|

10.2. Chemical stability

| | |
|--------|--|
| Advice | : Stable under recommended storage conditions. |
|--------|--|

10.3. Possibility of hazardous reactions

| | |
|---------------------|---|
| Hazardous reactions | : Reacts exothermically with water. Gives off hydrogen by reaction with metals. Exothermic reaction with: Alkali metals Bases Hydrogen peroxide Risk of explosion. |
|---------------------|---|

10.4. Conditions to avoid

| | |
|---------------------|--------|
| Conditions to avoid | : Heat |
|---------------------|--------|

10.5. Incompatible materials

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

10.6. Hazardous decomposition products

| | |
|----------------------------------|---|
| Hazardous decomposition products | : Under fire conditions: Sulphur oxides |
|----------------------------------|---|

SECTION 11: Toxicological information**11.1. Information on toxicological effects**

SULPHURIC ACID 51 - <94%**Data for the product****Acute toxicity****Oral**

Not classified based on the calculation method according to CLP regulation.

Inhalation

Not classified based on the calculation method according to CLP regulation.

Dermal

Not classified based on the calculation method according to CLP regulation.

Irritation**Skin**

Result : Classified based on the calculation method according to CLP regulation.

Eyes

Result : Classified based on the calculation method according to CLP regulation.

Sensitisation

Result : Not classified based on the calculation method according to CLP regulation.

CMR effects**CMR Properties**

Carcinogenicity : Not classified based on the calculation method according to CLP regulation.
 Mutagenicity : Not classified based on the calculation method according to CLP regulation.
 Reproductive toxicity : Not classified based on the calculation method according to CLP regulation.

Specific Target Organ Toxicity**Single exposure**

Remarks : Not classified based on the calculation method according to CLP regulation.

Repeated exposure

Remarks : Not classified based on the calculation method according to CLP regulation.

SULPHURIC ACID 51 - <94%**Other toxic properties****Repeated dose toxicity**

no data available

Aspiration hazard

Not applicable,

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

LD50 : 2140 mg/kg (Rat)

Inhalation

No valid data available.

Dermal

Study scientifically not justified.

Irritation**Skin**

Result : corrosive effects

Eyes

Result : corrosive effects

Sensitisation

Result : Study scientifically not justified.

CMR effects**CMR Properties**

Carcinogenicity : Animal testing did not show any carcinogenic effects.
 Mutagenicity : Animal testing did not show any mutagenic effects.
 Teratogenicity : Did not show teratogenic effects in animal experiments.
 Reproductive toxicity : Study scientifically not justified.

SULPHURIC ACID 51 - <94%**Specific Target Organ Toxicity****Single exposure**

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

Repeated exposure

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

Other toxic properties**Aspiration hazard**

Not applicable,

SECTION 12: Ecological information**12.1. Toxicity**

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

Acute toxicity**Fish**

LC50 : 794 mg/l (Fish; 24 h) (Toxicity to fish; OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 29 mg/l (Daphnia (water flea); 24 h) (Toxicity to daphnia; ISO 6341)

algae

EC50 : > 50 mg/l (algae; 24 h) (Toxicity to algae; End point: Growth rate; OECD Test Guideline 201)

12.2. Persistence and degradability

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

Persistence and degradability

SULPHURIC ACID 51 - <94%**Persistence**

Result : decomposition by hydrolysis.

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 : Bioaccumulation is not expected.

12.4. Mobility in soil

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

Mobility

: study scientifically unjustified

12.5. Results of PBT and vPvB assessment

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

Results of PBT and vPvB assessment

Result : The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.

12.6. Other adverse effects

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

Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
Harmful effects to aquatic organisms due to pH-shift.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Product : Disposal together with normal waste is not allowed. Special

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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. If recycling is not practicable, dispose of in compliance with local regulations.

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**

1830

14.2. UN proper shipping name

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

14.3. Transport hazard class(es)

ADR-Class : 8
(Labels; Classification Code; Hazard Identification Number; Tunnel restriction code) 8; C1; 80; (E)
RID-Class : 8
(Labels; Classification Code; Hazard Identification Number) 8; C1; 80
IMDG-Class : 8
(Labels; EmS) 8; F-A, S-B

14.4. Packaging group

ADR : II
RID : II
IMDG : II

14.5. Environmental hazards

Environmentally hazardous according to ADR : no
Environmentally hazardous according to RID : no
Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

SULPHURIC ACID 51 - <94%**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****Data for the product**

Restricted (Annex I) & Reportable (Annex II) Explosives Precursors, Regulation (EU) 2019/1148 : ; Restricted explosives precursors: Acquisition, introduction, possession or use of this product by the general public is restricted by Regulation (EU) 2019/1148. All suspicious transactions, and significant disappearances and thefts should be reported to the relevant national contact point. Please see https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/crisis-and-terrorism/explosives/explosives-precursors/docs/list_of_competent_authorities_and_national_contact_points_en.pdf

EU. REACH, Annex XVII, Marketing and Use Restrictions (Regulation 1907/2006/EC) : Point Nos.: , 3; Listed

EU. Directive 2012/18/EU (SEVESO III) Annex I : ; The substance/mixture does not fall under this legislation.

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

EU. Regulation EU No. 649/2012 concerning the export and import of dangerous chemicals : ; The substance/mixture does not fall under this legislation.

EU. Regulation 273/2004, Drug Precursors, Category 3 : Scheduled substance Combined Nomenclature (CN) code: , 2807 00 10

EU. Annexes I and II, Regulation 98/2013/EU on the Marketing and Use of Explosives Precursors : ; Annex II: Substances on their own or in mixtures or in substances for which suspicious transactions shall be reported.; Listed

Combined Nomenclature (CN) Number(s): 2807 00 10;
Combined Nomenclature (CN) code for a separate chemically defined compound; Listed

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Restricted (Annex I) &
Reportable (Annex II)
Explosives Precursors,
Regulation (EU)
2019/1148

Combined Nomenclature (CN) Number(s): 3824 90 97;
Combined Nomenclature (CN) code for a mixture without
constituents; Listed

Upper limit value for licensing: 40 %; ANNEX I: RESTRICTED
EXPLOSIVES PRECURSORS: List of substances which are
not to be made available to, or introduced, possessed or used
by, members of the general public, whether on their own or in
mixtures or substances that include those substances, unless
the concentration is equal to or lower than the limit values set
out in column 2, and for which suspicious transactions and
significant disappearances and thefts are to be reported within
24 hours.

Limit value: 15 %; ANNEX I: RESTRICTED EXPLOSIVES
PRECURSORS: List of substances which are not to be made
available to, or introduced, possessed or used by, members of
the general public, whether on their own or in mixtures or
substances that include those substances, unless the
concentration is equal to or lower than the limit values set out
in column 2, and for which suspicious transactions and
significant disappearances and thefts are to be reported within
24 hours.

EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

EU. Regulation No : EC Number: , 231-639-5; Listed
1451/2007 [Biocides],
Annex I, OJ (L 325)

EU. Directive : ; The substance/mixture does not fall under this legislation.
2012/18/EU (SEVESO
III) Annex I

**Notification status
sulphuric acid:**

| Regulatory List | Notification | Notification number |
|-----------------|--------------|---------------------|
| AICS | YES | |
| DSL | YES | |
| EINECS | YES | 231-639-5 |
| ENCS (JP) | YES | (1)-430 |
| IECSC | YES | |
| ISHL (JP) | YES | (1)-430 |
| KECI (KR) | YES | 97-1-405 |
| KECI (KR) | YES | KE-32570 |
| NZIOC | YES | HSR001572 |

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| | | |
|------------|-----|-----------|
| NZIOC | YES | HSR001573 |
| NZIOC | YES | HSR001588 |
| PICCS (PH) | YES | |
| TSCA | YES | |

15.2. Chemical safety assessment

no data available

SECTION 16: Other information**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. |
| H318 | Causes serious eye damage. |

Abbreviations and Acronyms

| | |
|----------------------------|---|
| BCF | bioconcentration factor |
| BOD | biochemical oxygen demand |
| CAS | Chemical Abstracts Service |
| CLP | Classification, Labelling and Packaging |
| CMR | carcinogenic, mutagenic or toxic to reproduction |
| COD | chemical oxygen demand |
| DNEL | derived no-effect level |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| ELINCS | European List of Notified Chemical Substances |
| GHS | Globally Harmonized System of Classification and Labelling of Chemicals |
| LC50 | median lethal concentration |
| LOAEC | lowest observed adverse effect concentration |
| LOAEL | lowest observed adverse effect level |
| LOEL | lowest observed effect level |
| NLP | no-longer polymer |
| NOAEC | no observed adverse effect concentration |
| NOAEL | no observed adverse effect level |
| NOEC | no observed effect concentration |
| NOEL | no observed effect level |
| OECD | Organisation for Economic Cooperation and Development |
| OEL | occupational exposure limit |
| PBT | persistent, bioaccumulative and toxic |
| REACH Auth. No.: | REACH Authorisation Number |
| REACH AuthAppC. No. | REACH Authorisation Application Consultation Number |

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| | |
|-------------|---|
| PNEC | predicted no-effect concentration |
| STOT | specific target organ toxicity |
| SVHC | substance of very high concern |
| UVCB | substance of unknown or variable composition, complex reaction products or biological materials |
| vPvB | very persistent and very bioaccumulative |

Further information

Key literature references : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

Methods used for product classification : The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.

Hints for trainings : The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.

Other information : 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.

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| 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 | Manufacture of substance | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b, 9 | 1 | NA | ES529 |
| 2 | Formulation & (re)packing of substances and mixtures | 3 | 10 | NA | 1, 3, 5, 8a, 8b, 9 | 2 | NA | ES689 |
| 3 | Use in cleaning agents | 3 | NA | 35 | 2, 5, 8a, 8b, 9, 10, 13 | NA | NA | ES796 |
| 4 | Use in laboratories | 22 | NA | 21 | 15 | 8a, 8b | NA | ES906 |
| 5 | Use for extractions and processing of minerals, ores | 3 | 2a, 14 | 20, 40 | 2, 3, 4 | 4, 6b | NA | ES784 |
| 6 | Use as processing aid | 3 | 4, 5, 6b, 8, 9, 11, 23 | 20 | 1, 2, 3, 4, 8a, 8b, 9, 13 | 6b | NA | ES782 |
| 7 | Use in electrolytic processes | 3 | 14, 15, 17 | 14, 20 | 1, 2, 8b, 9, 13 | 5, 6b | NA | ES788 |
| 8 | 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 |
| 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 |
| 12 | Use of sulphuric acid contained batteries | 21 | NA | NA | NA | 9b | 3 | ES1117 |
| 13 | Use as an intermediate | 3 | 4, 6b, 8, 9, 14 | 19 | 1, 2, 3, 4, 8a, 8b, 9 | 6a | NA | ES679 |
| 14 | Use in gas treatment | 3 | 8 | 20 | 1, 2, 8b | 7 | NA | ES790 |

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 1: Manufacture of substance**

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> |
| 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% - 100% |
| Amount used | Annual amount per site | 1.2 Million tonnes/year |
| | Annual amount used per region | 19 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 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 | Concentration of substance in product: 25% - 100% |
| | Physical Form (at time of use) | liquid |
| | Vapour pressure | 0.06 hPa |

SULPHURIC ACID 51 - <94%

| | | |
|--|---|---------------|
| 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) | |
| | 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**

ERC1: EUSES V2.1 tier 2

| Contributing Scenario | Specific conditions | Compartment | Value | Level of Exposure | RCR |
|-----------------------|---------------------|----------------------|-------|-------------------|---------|
| ERC1 | --- | Fresh water | PEC | 0.011µg/L | 0.00440 |
| ERC1 | --- | Marine water | PEC | 0.0016µg/L | 0.00640 |
| ERC1 | --- | Fresh water sediment | PEC | 0.97ng/kg | 0.00049 |
| ERC1 | --- | Marine sediment | PEC | 0.14ng/kg | 0.00007 |
| ERC1 | --- | Soil | PEC | 0.05µg/kg | --- |
| ERC1 | --- | Air | PEC | 0.18ng/m3 | --- |

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|-----------------|-------------------|-----|
|-----------------------|---------------------|-----------------|-------------------|-----|

SULPHURIC ACID 51 - <94%

| | | | | |
|--------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.092ng/m ³ | --- |
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.42µg/m ³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 14µg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 23µg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 2.8µg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 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 |

SULPHURIC ACID 51 - <94%

| | | |
|--|---|------------------------|
| | 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 m ³ /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 | 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**

ERC2: 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/m ³ | --- |

Workers

PROC1, PROC3, PROC5, PROC8a, PROC8b, PROC9: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|----------------------------|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long- | 0.0009ng/m ³ | --- |

SULPHURIC ACID 51 - <94%

| | | term - systemic | | |
|--------|-----------------------|---|-------------------------|-----|
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.42µg/m ³ | --- |
| PROC5 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.016mg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 0.023mg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0004µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0028mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 3: Use in cleaning agents**

| | |
|---------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Chemical product category | PC35: Washing and cleaning products |
| Process categories | PROC2: Use in closed, continuous process with occasional controlled exposure 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) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring |

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13

| | | |
|--|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Concentration of substance in product : 0% - 10% |
| | Physical Form (at time of use) | liquid |
| | Vapour pressure | 2.14 hPa |
| Frequency and duration of use | Frequency of use | 220 days/year |
| | Frequency of use | 8 hours/day |
| | Intermittent contact is expected | |
| Human factors not influenced by risk management | Breathing volume | 10 m3/day |
| | Exposed skin area | 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 | |
| | 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 | Provide local exhaust ventilation (LEV).(PROC2, PROC5) | |
| 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**Workers**

PROC2, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|-----------------|-------------------|-----|
|-----------------------|---------------------|-----------------|-------------------|-----|

SULPHURIC ACID 51 - <94%

| | | | | |
|--------|-----------------------|---|-------------------------|-----|
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.480µg/m ³ | --- |
| PROC5 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.053mg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048mg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048mg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048mg/m ³ | --- |
| PROC10 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.53mg/m ³ | --- |
| PROC13 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0053mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 4: 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 | Workers wear protective clothing (face/eye protection, helmet, anti-acid gloves, | |

SULPHURIC ACID 51 - <94%

| | |
|---|--------------------------------|
| to personal protection, hygiene and health evaluation | boots and protective coverall) |
|---|--------------------------------|

3. Exposure estimation and reference to its source**Environment**

ERC8a, ERC8b: 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

PROC15: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------|-----|
| PROC15 | 90th percentile value | Worker - inhalative, 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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 5: 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: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 | |

SULPHURIC ACID 51 - <94%

| | |
|--|---|
| 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**

ERC4, ERC6b: 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

PROC2, PROC3, PROC4: Advanced REACH Tool (ART model)

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

SULPHURIC ACID 51 - <94%

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 6: 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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 |
| Activity | Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered |

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 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 |

SULPHURIC ACID 51 - <94%

| | | |
|---|---|--|
| | 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 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 m ³ /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 | 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**

ERC6b: 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 |

SULPHURIC ACID 51 - <94%

| | | | | | |
|-------|-----|-----------------|-----|-------------------------|---------|
| ERC6b | --- | Marine sediment | PEC | 0.074ng/kg | 0.00004 |
| ERC6b | --- | Soil | PEC | 0.027µg/kg | --- |
| ERC6b | --- | Air | PEC | 0.0000µg/m ³ | --- |

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.092ng/m ³ | --- |
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.42µg/m ³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.014mg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 0.023mg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0028mg/m ³ | --- |
| PROC13 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.016mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 7: 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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions 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 | |

SULPHURIC ACID 51 - <94%

| | | |
|--|---|------------------------|
| Human factors not influenced by risk management | Breathing volume | 10 m ³ /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 | 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**

ERC5, ERC6b: 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/m ³ | --- |
| 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/m ³ | --- |

Workers

PROC1, PROC2, PROC8b, PROC9, PROC13: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |

SULPHURIC ACID 51 - <94%

| | | | | |
|--------|-----------------------|---|-------------------------|-----|
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.092ng/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0028mg/m ³ | --- |
| PROC13 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.47mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 8: 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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 |

SULPHURIC ACID 51 - <94%

| | | |
|--|---|---------------------|
| | 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 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 | 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**

ERC6b: 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

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC13: Advanced REACH Tool (ART model)

SULPHURIC ACID 51 - <94%

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0920ng/m ³ | --- |
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.42µg/m ³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.014mg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 0.023mg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0028mg/m ³ | --- |
| PROC13 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.016mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**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: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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 | |

SULPHURIC ACID 51 - <94%

| | |
|---|---|
| | 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**

ERC2, ERC5: 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

PROC2, PROC3, PROC4, PROC9: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------|-----|
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 1.4µg/m³ | --- |
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.014mg/m³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0012mg/m³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, 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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks

SULPHURIC ACID 51 - <94%

are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%

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 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 | |

SULPHURIC ACID 51 - <94%

| | |
|--|---|
| Technical conditions and measures to control dispersion from source towards the worker | Provide local exhaust ventilation (LEV). |
| 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**

ERC1: 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/m ³ | --- |

Workers

PROC2, PROC4, PROC5, PROC8a: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0012mg/m ³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.004mg/m ³ | --- |
| PROC5 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.013mg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 0.006mg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**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 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 | |
| | 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) | |

SULPHURIC ACID 51 - <94%**3. Exposure estimation and reference to its source****Environment**

ERC8b, ERC9b: 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 - inhalative, 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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%

1. Short title of Exposure Scenario 12: Use of sulphuric acid contained batteries

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Article categories | AC3: Electrical batteries and accumulators |
| Environmental Release Categories | ERC9b: Wide dispersive outdoor use of substances in closed systems |

2.1 Contributing scenario controlling environmental exposure for: 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 consumer exposure for: AC3

| | | |
|--|---|--|
| 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 | < 0.1 hPa |
| Frequency and duration of use | Exposure duration per day | 240 min |
| Human factors not influenced by risk management | Breathing volume | 10 m3/day |
| | Exposed skin surface | 480 cm ² |
| Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene) | Consumer Measures | Batteries should only be opened in a well-ventilated place |
| | Consumer Measures | Batteries should not be opened unnecessarily |
| | Consumer Measures | Batteries should stand on firm ground to prevent spill |
| | Consumer Measures | Wear suitable coveralls to prevent exposure to the skin. |
| | Consumer Measures | Wear acid-resistant gloves |
| | Consumer Measures | Wear eye protection/ face protection. |

3. Exposure estimation and reference to its source

SULPHURIC ACID 51 - <94%**Environment**

ERC9b: EUSES V2.1 tier 2

| Contributing Scenario | Specific conditions | Compartment | Value | Level of Exposure | RCR |
|-----------------------|---------------------|----------------------|-------|-------------------|--------|
| ERC9b | --- | Fresh water | PEC | 0.0335µg/L | 0.0134 |
| ERC9b | --- | Marine water | PEC | 0.0018µg/L | 0.0074 |
| ERC9b | --- | Fresh water sediment | PEC | 2.89ng/kg | 0.0014 |
| ERC9b | --- | Marine sediment | PEC | 0.16ng/kg | 0.0001 |
| ERC9b | --- | Soil | PEC | 33.5ng/kg | --- |
| ERC9b | --- | Air | PEC | 0.12ng/m3 | --- |

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. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 13: 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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition 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) |
| Activity | Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered |

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 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

SULPHURIC ACID 51 - <94%

| | | |
|--|---|---|
| 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 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 | 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**

ERC6a: 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/m ³ | --- |

SULPHURIC ACID 51 - <94%**Workers**

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.092ng/m ³ | --- |
| PROC3 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.42µg/m ³ | --- |
| PROC4 | 90th percentile value | Worker - inhalative, long-term - systemic | 14µg/m ³ | --- |
| PROC8a | 90th percentile value | Worker - inhalative, long-term - systemic | 23µg/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |
| PROC9 | 90th percentile value | Worker - inhalative, long-term - systemic | 2.8µg/m ³ | --- |

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SULPHURIC ACID 51 - <94%**1. Short title of Exposure Scenario 14: 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: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions 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 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 |

SULPHURIC ACID 51 - <94%

| | | |
|--|---|---------------------|
| | 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 | 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**

ERC7: 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/m ³ | --- |

Workers

PROC1, PROC2, PROC8b: Advanced REACH Tool (ART model)

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|-----------------------|---|-------------------------|-----|
| PROC1 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0094ng/m ³ | --- |
| PROC2 | 90th percentile value | Worker - inhalative, long-term - systemic | 0.092ng/m ³ | --- |
| PROC8b | 90th percentile value | Worker - inhalative, long-term - systemic | 0.0048µg/m ³ | --- |

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

SULPHURIC ACID 51 - <94%

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.