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

Revision Date 06.06.2017 Version 2.2

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

1.1 Product identifier

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

REACH Registration Number A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. 7664-93-9

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

Identified uses
Reagent for analysis, Chemical production
Reagent for analysis, Chemical production
For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).
In compliance with the conditions described in the annex to this safety data sheet.

1.3 Details of the supplier of the safety data sheet

Company Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department LS-QHC * e-mail: prodsafe@merckgroup.com
Regional representation This information is given on the authorised Safety Data Sheet for your country.

1.4 Emergency telephone number
Please contact the regional Merck representation in your country.
SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

- Corrosive to metals, Category 1, H290
- Skin corrosion, Category 1A, H314

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

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

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.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.
Reduced labelling (≤125 ml)

Hazard pictograms

Signal word
Danger

Hazard statements
H314 Causes severe skin burns and eye damage.

Precautionary statements
P280 Wear protective gloves / protective clothing / eye protection / face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor / physician.

Index-No. 016-020-00-8

2.3 Other hazards
None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

<table>
<thead>
<tr>
<th>Formula</th>
<th>H₂SO₄</th>
<th>H₄O₄S (Hill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index-No.</td>
<td>016-020-00-8</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>231-639-5</td>
<td></td>
</tr>
<tr>
<td>Molar mass</td>
<td>98,08 g/mol</td>
<td></td>
</tr>
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</table>

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Registration number</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>sulphuric acid (&gt;= 50 % - &lt;= 100 %)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

7664-93-9 01-2119458838-20-
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

XXX Corrosive to metals, Category 1, H290
Skin corrosion, Category 1A, H314

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

3.2 Mixture
Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice
First aider needs to protect himself.

After inhalation: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed

Risk of blindness!
Irritation and corrosion, Cough, Shortness of breath
Nausea, Vomiting, Diarrhoea, pain

4.3 Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.

Ambient fire may liberate hazardous vapours.

Fire may cause evolution of:

Sulphur oxides

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10).
Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H⁺, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Observe label precautions.

Hygiene measures
Change contaminated clothing and immerse in water. Preventive skin protection Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers
No metal containers.

Storage conditions
Tightly closed.

Recommended storage temperature see product label.

7.3 Specific end use(s)
See exposure scenario in the Annex to this MSDS.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters
Contains no substances with occupational exposure limit values.

### Derived No Effect Level (DNEL)

**sulphuric acid (7664-93-9)**

<table>
<thead>
<tr>
<th>Worker DNEL, acute</th>
<th>Local effects</th>
<th>Inhalation</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1 mg/m³</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker DNEL, longterm</th>
<th>Local effects</th>
<th>Inhalation</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.05 mg/m³</td>
</tr>
</tbody>
</table>

### Predicted No Effect Concentration (PNEC)

**sulphuric acid (7664-93-9)**

<table>
<thead>
<tr>
<th>Environment</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water</td>
<td>0.0025 mg/l</td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>0.002 mg/kg</td>
</tr>
<tr>
<td>Marine water</td>
<td>0.00025 mg/l</td>
</tr>
<tr>
<td>Marine sediment</td>
<td>0.002 mg/kg</td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>8.8 mg/l</td>
</tr>
</tbody>
</table>

### 8.2 Exposure controls

#### Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

#### Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

**Eye/face protection**

Tightly fitting safety goggles

**Hand protection**

full contact:
The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 890 Vitoject® (full contact), KCL 898 Butoject® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment
Acid-resistant protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Recommended Filter type: filter ABEK
The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls
Do not let product enter drains.

SECTION 9. Physical and chemical properties
9.1 Information on basic physical and chemical properties
Form liquid
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalogue No.</td>
<td>112080</td>
</tr>
<tr>
<td>Product name</td>
<td>Sulfuric acid 98% for analysis EMSURE®</td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
</tr>
<tr>
<td>Odour</td>
<td>odourless</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>at 49 g/l</td>
</tr>
<tr>
<td></td>
<td>25 °C</td>
</tr>
<tr>
<td>Melting point</td>
<td>-20 °C</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>ca. 335 °C</td>
</tr>
<tr>
<td></td>
<td>at 1.013 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available.</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>ca.0.0001 hPa</td>
</tr>
<tr>
<td></td>
<td>at 20 °C</td>
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<tr>
<td>Relative vapour density</td>
<td>ca.3.4</td>
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<tr>
<td>Density</td>
<td>1.84 g/cm³</td>
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<tr>
<td></td>
<td>at 20 °C</td>
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<tr>
<td>Relative density</td>
<td>No information available.</td>
</tr>
</tbody>
</table>
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Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

Water solubility at 20 °C
soluble, (caution ! development of heat)

Partition coefficient: n-octanol/water No information available.
Auto-ignition temperature No information available.
Decomposition temperature No information available.

Viscosity, dynamic ca.24 mPa.s
at 20 °C

Explosive properties Not classified as explosive.

Oxidizing properties Oxidizing potential

9.2 Other data
Ignition temperature Not applicable
Bulk density Not applicable
Corrosion May be corrosive to metals.

SECTION 10. Stability and reactivity

10.1 Reactivity
strong oxidising agent

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
A risk of explosion and/or of toxic gas formation exists with the following substances:

Violent reactions possible with:
Water, Alkali metals, alkali compounds, Ammonia, Aldehydes, acetonitrile, Alkaline earth metals, alkalines, Acids, alkaline earth compounds, Metals, metal alloys, Oxides of phosphorus, phosphorus, hydrides, halogen-halogen compounds, oxyhalogenic compounds, permanganates, nitrates, carbides, combustible substances, organic solvent, acetylidene, Nitriles, organic nitro compounds, anilines, Peroxides, picrates, nitrates, lithium silicide, iron(III) compounds, bromates, chlorates, Amines, perchlorates, hydrogen peroxide

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
animal/vegetable tissues, Metals
Contact with metals liberates hydrogen gas.

10.6 Hazardous decomposition products
in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity
This information is not available.

Acute inhalation toxicity

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:; damage of respiratory tract

Acute dermal toxicity
This information is not available.

Skin irritation
Causes severe burns.

Eye irritation

Causes serious eye damage.
Risk of blindness!
Sensitisation
This information is not available.

Germ cell mutagenicity
This information is not available.

Carcinogenicity
This information is not available.

Reproductive toxicity
This information is not available.

Teratogenicity
This information is not available.

Specific target organ toxicity - single exposure
This information is not available.

Specific target organ toxicity - repeated exposure
This information is not available.

Aspiration hazard
This information is not available.

11.2 Further information
After inhalation of aerosols: damage to the affected mucous membranes. After skin contact:
severe burns with formation of scabs. After eye contact: burns, corneal lesions. After
swallowing: severe pain (risk of perforation!), nausea, vomiting and diarrhoea. After a latency
period of several weeks possibly pyloric stenosis.
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

12.1 Toxicity
No information available.

12.2 Persistence and degradability
No information available.

12.3 Bioaccumulative potential
No information available.
12.4 Mobility in soil
No information available.

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects
Additional ecological information
Biological effects:
Forms corrosive mixtures with water even if diluted. Harmful effect due to pH shift. Endangers drinking-water supplies if allowed to enter soil or water.
Discharge into the environment must be avoided.
SECTION 13. Disposal considerations

Waste treatment methods

Notice Directive on waste 2008/98/EC.

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number UN 1830
14.2 Proper shipping name SULPHURIC ACID
14.3 Class 8
14.4 Packing group II
14.5 Environmentally hazardous --
14.6 Special precautions for user yes

Tunnel restriction code E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number UN 1830
14.2 Proper shipping name SULPHURIC ACID
14.3 Class 8
14.4 Packing group II
14.5 Environmentally hazardous --
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according to Regulation (EC) No. 1907/2006

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

14.6 Special precautions for user
no

Sea transport (IMDG)
14.1 UN number UN 1830
14.2 Proper shipping name SULPHURIC ACID
14.3 Class 8
14.4 Packing group II
14.5 Environmentally hazardous --
14.6 Special precautions for user yes
EmS F-A S-B

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15. Regulatory information
15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations
Major Accident Hazard SEVESO III
Legislation Not applicable
Occupational restrictions Take note of Dir 94/33/EC on the protection of young people at work.

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer not regulated

Substances of very high concern (SVHC)  This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).

National legislation
Storage class 8B

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

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.

Training advice
Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms

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.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.
EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Reagent for analysis, Chemical production)

Sectors of end-use

SU 3  Industrial uses: Uses of substances as such or in preparations at industrial sites
SU 9  Manufacture of fine chemicals
SU 10 Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Chemical product category

PC19 Intermediate
PC21 Laboratory chemicals

Process categories

PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
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
PROC15 Use as laboratory reagent

Environmental Release Categories

ERC1 Manufacture of substances
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC1

Amount used

Daily amount per site 1500 t

Environment factors not influenced by risk management

Dilution Factor (River) 10

Other given operational conditions affecting environmental exposure

Continuous use/release
Number of emission days per year 365

Technical conditions and measures / Organizational measures

Air Use of air emission abatement equipments.

Water Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal 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 Sewage sludge should not be applied to natural soils.

2.2 Contributing scenario controlling environmental exposure for: ERC2

Amount used

Annual amount per site 300000 t

Environment factors not influenced by risk management

Dilution Factor (River) 10

Other given operational conditions affecting environmental exposure

Continuous use/release
SAFETY DATA SHEET
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Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

Number of emission days per year 365

Technical conditions and measures / Organizational measures
Air Use of air emission abatement equipments.
Water Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal sewage treatment plant
Type of Sewage Treatment Plant Municipal sewage treatment plant
Flow rate of sewage treatment 2.000 m3/d
Sludge Treatment Sewage sludge should not be applied to natural soils.

2.3 Contributing scenario controlling environmental exposure for: ERC4

Amount used
Annual amount per site 438 t

Environment factors not influenced by risk management
Dilution Factor (River) 10

Other given operational conditions affecting environmental exposure
Continuous use/release
Number of emission days per year 365

Technical conditions and measures / Organizational measures
Air Use of air emission abatement equipments.
Water Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal sewage treatment plant
Type of Sewage Treatment Plant Municipal sewage treatment plant
Flow rate of sewage treatment 2.000 m3/d

2.4 Contributing scenario controlling environmental exposure for: ERC6a

**Amount used**
- Annual amount per site: 300000 t

**Environment factors not influenced by risk management**
- Dilution Factor (River): 10

**Other given operational conditions affecting environmental exposure**
- Continuous use/release
- Number of emission days per year: 365

**Technical conditions and measures / Organizational measures**
- **Air**: Use of air emission abatement equipments.
- **Water**: Solutions with low pH-value must be neutralized before discharge.

**Conditions and measures related to municipal 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**: Sewage sludge should not be applied to natural soils.

2.5 Contributing scenario controlling environmental exposure for: ERC6b

**Amount used**
- Annual amount per site: 100000 t

**Environment factors not influenced by risk management**
- Dilution Factor (River): 10

Sewage sludge should not be applied to natural soils.
Other given operational conditions affecting environmental exposure

Continuous use/release
Number of emission days per year 365

Technical conditions and measures / Organizational measures

Air
Use of air emission abatement equipments.

Water
Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal 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
Sewage sludge should not be applied to natural soils.

2.6 Contributing scenario controlling worker exposure for: PROC1

Product characteristics

Concentration of the Substance in Mixture/Article
Covers the percentage of the substance in the product up to 100 %.

Physical Form (at time of use) Low volatile liquid

Process Temperature < 130 °C

Frequency and duration of use

Frequency of use 8 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor Indoor without local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.
2.7 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC15

Product characteristics

Concentration of the Substance in Mixture/Article: Covers the percentage of the substance in the product up to 100%.

Physical Form (at time of use): Low volatile liquid

Process Temperature: < 130 °C

Frequency and duration of use

Frequency of use: 8 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor: Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>CS</th>
<th>Use descriptor</th>
<th>Msafe</th>
<th>Compartment</th>
<th>RCR</th>
<th>Exposure Assessment Method</th>
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<td>ERC1</td>
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<td>&lt; 1</td>
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<td>&lt; 1</td>
<td>EUSES</td>
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<td>2.4</td>
<td>ERC6a</td>
<td></td>
<td>All compartments</td>
<td>&lt; 1</td>
<td>EUSES</td>
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<tr>
<td>2.5</td>
<td>ERC6b</td>
<td></td>
<td>All compartments</td>
<td>&lt; 1</td>
<td>EUSES</td>
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</tbody>
</table>
The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).

For (other) local effects risk management measures are based on qualitative risk characterisation.

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH
SAFETY DATA SHEET
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Product name Sulfuric acid 98% for analysis EMSURE®

Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.
EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Reagent for analysis, Chemical production)

   Sectors of end-use
   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
   ERC2  Formulation of preparations
   ERC6a  Industrial use resulting in manufacture of another substance (use of intermediates)
   ERC6b  Industrial use of reactive processing aids

2. Contributing scenarios: Operational conditions and risk management measures
2.1 Contributing scenario controlling environmental exposure for: ERC2

   Amount used
   Annual amount per site  300000 t

   Environment factors not influenced by risk management
   Dilution Factor (River)  10

   Other given operational conditions affecting environmental exposure
   Continuous use/release
   Number of emission days per year  365

   Technical conditions and measures / Organizational measures
   Air  Use of air emission abatement equipments.
   Water  Solutions with low pH-value must be neutralized before discharge.
 Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant  Municipal sewage treatment plant
Flow rate of sewage treatment  2.000 m3/d
Sludge Treatment  Sewage sludge should not be applied to natural soils.

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Amount used
Annual amount per site  300000 t

Environment factors not influenced by risk management
Dilution Factor (River)  10

Other given operational conditions affecting environmental exposure
Continuous use/release
Number of emission days per year  365

Technical conditions and measures / Organizational measures
Air  Use of air emission abatement equipments.
Water  Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant  Municipal sewage treatment plant
Flow rate of sewage treatment  2.000 m3/d
Sludge Treatment  Sewage sludge should not be applied to natural soils.

2.3 Contributing scenario controlling environmental exposure for: ERC6b
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

Amount used
Annual amount per site 100000 t

Environment factors not influenced by risk management
Dilution Factor (River) 10

Other given operational conditions affecting environmental exposure
Continuous use/release
Number of emission days per year 365

Technical conditions and measures / Organizational measures
Air Use of air emission abatement equipments.
Water Solutions with low pH-value must be neutralized before discharge.

Conditions and measures related to municipal 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 Sewage sludge should not be applied to natural soils.

2.4 Contributing scenario controlling worker exposure for: PROC15

Product characteristics
Concentration of the Substance in Mixture/Article Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use) Low volatile liquid
Process Temperature < 130 °C

Frequency and duration of use
Frequency of use < 4 hours/day

Other operational conditions affecting workers exposure

The Safety Data Sheets for catalogue items are available at www.merckgroup.com
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

Outdoor / Indoor Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure
Avoid carrying out operation for more than 4 hours.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>CS</th>
<th>Use descriptor</th>
<th>Msafe</th>
<th>Compartment</th>
<th>RCR</th>
<th>Exposure Assessment Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>ERC2</td>
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<td>EUSES</td>
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</table>

Workers

<table>
<thead>
<tr>
<th>CS</th>
<th>Use descriptor</th>
<th>Exposure duration, route, effect</th>
<th>RCR</th>
<th>Exposure Assessment Method</th>
</tr>
</thead>
<tbody>
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<td>PROC15</td>
<td>acute, inhalative, local</td>
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<td>ECETOC TRA</td>
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<tr>
<td></td>
<td></td>
<td>longterm, inhalative, local</td>
<td>0,98</td>
<td>ECETOC TRA</td>
</tr>
</tbody>
</table>

For (other) local effects risk management measures are based on qualitative risk characterisation.

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).
SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 112080
Product name Sulfuric acid 98% for analysis EMSURE®

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.