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

#### Product information

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Sulfole® 100 Mercaptan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>1098106, 1024816, 1021527, 1035961, 1021528, 1021529, 1021526, 1027474, 1105025</td>
</tr>
</tbody>
</table>

**Relevant Identified Uses Supported**
- Manufacture
- Formulation
- Use in polymer processing – industrial
- Lubricants - Industrial
- Use in mining – industrial

**Company**
- Chevron Phillips Chemical Company LP
- Specialty Chemicals
- 10001 Six Pines Drive
- The Woodlands, TX 77380

**Local**
- Chevron Phillips Chemicals International N.V.
- Airport Plaza (Stockholm Building)
- Leonardo Da Vinci Laan 19
- 1831 Diegem
- Belgium

**SDS Requests:** (800) 852-5530
**Technical Information:** (832) 813-4862
**Responsible Party:** Product Safety Group
**Email:** sds@cpchem.com

**Emergency telephone:**

**Health:**
- 866.442.9628 (North America)
- 1.832.813.4984 (International)

**Transport:**
- CHEMTREC 800.424.9300 or 703.527.3887 (Int'l)
- Asia: +800 CHEMCALL (+800 2436 2255) China: +86-21-22157316
- EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
- South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

**Responsible Department:** Product Safety and Toxicology Group
**E-mail address:** sds@CPChem.com
SECTION 2: Hazards identification

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Hazard Class</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin irritation</td>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>Eye irritation</td>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>Acute aquatic toxicity</td>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>Chronic aquatic toxicity</td>
<td>H410</td>
<td>Very toxic to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms:

- !
- \( \text{Tree} \)

Signal Word: Warning

Hazard Statements:

- H315: Causes skin irritation.
- H317: May cause an allergic skin reaction.
- H319: Causes serious eye irritation.
- H410: Very toxic to aquatic life with long lasting effects.

Precautionary Statements:

**Prevention:**

- P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
- P273: Avoid release to the environment.
- P280: Wear eye protection/ face protection.
- P280: Wear protective gloves.

**Response:**

- P333 + P313: If skin irritation or rash occurs: Get medical advice/ attention.
- P362 + P364: Take off contaminated clothing and wash it before reuse.

Hazardous ingredients which must be listed on the label:

- 25103-58-6 tert-Dodecanethiol

SECTION 3: Composition/information on ingredients

Synonyms:

- 100 Mercaptan
- TNM and TDM Mixture
**Sulfole® 100 Mercaptan**

**Molecular formula**: Mixture

**Mixtures**

**Hazardous ingredients**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No. EC-No. Index No.</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Nonanethiol</td>
<td>25360-10-5 246-896-9</td>
<td>Aquatic Acute 1; H400 Aquatic Chronic 1; H410</td>
<td>60 - 75</td>
</tr>
<tr>
<td>tert-Dodecanethiol</td>
<td>25103-58-6 246-619-1</td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1B; H317 Aquatic Chronic 4; H413</td>
<td>15 - 40</td>
</tr>
</tbody>
</table>

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

**SECTION 4: First aid measures**

- **General advice**: Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Symptoms of poisoning may appear several hours later. Do not leave the victim unattended.
- **If inhaled**: If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.
- **In case of skin contact**: If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
- **In case of eye contact**: Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
- **If swallowed**: Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

**SECTION 5: Firefighting measures**

- **Flash point**: 67 °C (153 °F)
- **Autoignition temperature**: No data available
- **Suitable extinguishing media**: Carbon dioxide (CO2).
- **Unsuitable extinguishing media**: High volume water jet.
- **Specific hazards during firefighting**: Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for firefighting if necessary.

Further information: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.

Fire and explosion protection: Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.

Hazardous decomposition products: Carbon oxides. Sulfur oxides.

SECTION 6: Accidental release measures

Personal precautions: Use personal protective equipment. Ensure adequate ventilation.

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up: Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

For additional details, see the Exposure Scenario in the Annex portion.

SECTION 7: Handling and storage

Handling

Advice on safe handling: Avoid formation of aerosol. Do not breathe vapors/dust. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion: Do not spray on an open flame or any other incandescent material. Keep away from open flames, hot surfaces and sources of ignition.

Storage

Requirements for storage areas and containers: No smoking. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.
SECTION 8: Exposure controls/personal protection

Chevron Phillips Chemical Company LP

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>Manufacturer</td>
<td>TWA</td>
<td>0.1 ppm,</td>
<td></td>
</tr>
</tbody>
</table>

**Engineering measures**

Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the workplace when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

**Personal protective equipment**

Respiratory protection: Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Wear a NIOSH approved respirator that provides protection when working with this material if exposure to harmful levels of airborne material may occur, such as: Air-Purifying Respirator for Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection: The suitability for a specific workplace should be discussed with the producers of the protective gloves. 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. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection: Eye wash bottle with pure water. Tightly fitting safety goggles. Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant antistatic protective clothing. Footwear protecting against chemicals.

Hygiene measures: When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

For additional details, see the Exposure Scenario in the Annex portion.

SDS Number:100000014209

5/46
### SECTION 9: Physical and chemical properties

#### Information on basic physical and chemical properties

**Appearance**
- **Form**: Liquid
- **Physical state**: Liquid
- **Color**: Colorless
- **Odor**: Repulsive

**Safety data**
- **Flash point**: 67 °C (153 °F)
- **Lower explosion limit**: No data available
- **Upper explosion limit**: No data available
- **Autoignition temperature**: No data available
- **Thermal decomposition**: No data available

**Molecular formula**: Mixture
**Molecular weight**: Not applicable
**pH**: Not applicable
**Freezing point**: No data available
**Pour point**: No data available

**Boiling point/boiling range**: 188 - 233 °C (370 - 451 °F) estimated
**Vapor pressure**: 0,02 PSI at 25,5 °C (77,9 °F)
**Relative density**: 0,855 at 15,6 °C (60,1 °F)
**Density**: 853,2 g/l
**Water solubility**: Negligible
**Partition coefficient: n-octanol/water**: No data available
**Viscosity, dynamic**: 1,77 cP
**Relative vapor density**: 3 (Air = 1.0)
**Evaporation rate**: 1
**Percent volatile**: > 99 %
SECTION 10: Stability and reactivity

Chemical stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid: Avoid moisture. Heat, flames and sparks.

Materials to avoid: Avoid oxidizing agents.

Thermal decomposition: No data available

Hazardous decomposition products: Carbon oxides

Other data: No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

tert-Nonanethiol: LD50: 5.550 mg/kg
Species: Rat
Method: OECD Test Guideline 401
Symptoms: Disorientation, Loss of balance

tert-Dodecanethiol: LD50: > 5.000 mg/kg
Species: Rat
Sex: male and female
Method: OECD Test Guideline 401
Information given is based on data obtained from similar substances.

Acute inhalation toxicity

tert-Nonanethiol: LC50: >7.04milligram per literExposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor
Method: OECD Test Guideline 403

tert-Dodecanethiol: LC50: > 1.97milligram per literExposure time: 4 h
Species: Rat
Sex: male and female
Method: OECD Test Guideline 403
Information given is based on data obtained from similar substances.

Acute dermal toxicity
tert-Nonanethiol: LD50: >2000 milligram per kilogram
Species: Rat
Sex: male
Method: OECD Test Guideline 402

tert-Dodecanethiol: LD50: >2000 mg/kg
Species: Rat
Sex: male
Method: OECD Test Guideline 402

Information given is based on data obtained from similar substances.

Sulfole® 100 Mercaptan
Skin irritation: Causes skin irritation.

Sulfole® 100 Mercaptan
Eye irritation: Irritating to eyes.

Sensitization
tert-Nonanethiol: The results of a test on guinea pigs showed this substance to be a weak skin sensitizer.

tert-Dodecanethiol: The product is a skin sensitizer, sub-category 1B.

Repeated dose toxicity
tert-Nonanethiol: Species: Rat, male and female
Sex: male and female
Application Route: Inhalation
Dose: 0, 26, 98 ppm
Exposure time: 4 wk
Number of exposures: 6 h/d, 5 days/wk
Lowest observable effect level: 26 ppm
Method: OECD Guideline 412
Target Organs: Kidney, Liver

Information given is based on data obtained from similar substances.

tert-Dodecanethiol: Species: Rat, male
Sex: male
Application Route: Inhalation
Dose: 0, 26, 98 ppm
Exposure time: 4 wk
Number of exposures: 6 h/d, 5 d/wk
Lowest observable effect level: 26 ppm
Method: OECD Test Guideline 412
Target Organs: Kidney, Liver
Species: Rat, female  
Sex: female  
Application Route: Inhalation  
Dose: 0, 26, 98 ppm  
Exposure time: 4 wk  
Number of exposures: 6 h/d, 5 d/wk  
NOEL: 26 ppm  
Method: OECD Guideline 412  
Target Organs: Liver, Kidney

Species: Dog, male and female  
Sex: male and female  
Application Route: Inhalation  
Dose: 0, 25, 106 ppm  
Exposure time: 4 wk  
Number of exposures: 6 h/d, 5 d/wk  
NOEL: 25 ppm  
Lowest observable effect level: 109 ppm  
Method: OECD Test Guideline 412  
Target Organs: Liver

Species: Mouse, male and female  
Sex: male and female  
Application Route: Inhalation  
Dose: 0, 25, 109 ppm  
Exposure time: 4 wk  
Number of exposures: 6 h/d, 5 d/wk  
Lowest observable effect level: 25 ppm  
Method: OECD Test Guideline 412  
Target Organs: Liver

Species: Rat, male  
Sex: male  
Application Route: oral gavage  
Dose: 10, 50, 250 mg/kg  
Exposure time: 35 d  
Number of exposures: once daily  
NOEL: 50 mg/kg  
Method: OECD Guideline 422  
Target Organs: Liver, spleen  
Information given is based on data obtained from similar substances.

Species: Rat, female  
Sex: female  
Application Route: oral gavage  
Dose: 10, 50, 250 mg/kg  
Exposure time: 53 d  
Number of exposures: once daily  
NOEL: 50 mg/kg  
Method: OECD Guideline 422  
Target Organs: Liver, spleen  
Information given is based on data obtained from similar substances.

**Reproductive toxicity**

tert-Dodecanethiol  
Species: Rat  
Sex: male
SAFETY DATA SHEET

Sulfole® 100 Mercaptan

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Revision Date 2016-06-21

Application Route: oral gavage
Dose: 10, 50, 250 mg/kg/d
Exposure time: 35 d
Number of exposures: Daily
Method: OECD Guideline 422
NOAEL Parent: >= 250 mg/kg
Information given is based on data obtained from similar substances.

Species: Rat
Sex: female
Application Route: oral gavage
Dose: 10, 50, 250 mg/kg/d
Exposure time: 53 d
Number of exposures: Daily
Method: OECD Guideline 422
NOAEL Parent: 50 mg/kg
NOAEL F1: 50 mg/kg
Information given is based on data obtained from similar substances.
Decrease in Delivery Index

Developmental Toxicity

tert-Nonanethiol
Species: Rat
Application Route: Inhalation
Dose: 0, 22.7, 88.6 ppm
Number of exposures: 6 h/d
Test period: GD 6 - 19
Method: OECD Guideline 414
NOAEL Teratogenicity: >= 88.6 ppm
NOAEL Maternal: >= 88.6 ppm
No adverse effects expected
Information given is based on data obtained from similar substances.

tert-Dodecanethiol
Species: Rat
Application Route: Inhalation
Dose: 0, 22.7, 88.6 ppm
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: >= 88.6 ppm
No adverse effects expected

Species: Mouse
Application Route: Inhalation
Dose: 0, 22.7, 88.6 ppm
Number of exposures: 6 hrs/d
Test period: GD 6-19
Method: OECD Guideline 414
NOAEL Teratogenicity: >= 88.6 ppm
No adverse effects expected

Sulfole® 100 Mercaptan
Aspiration toxicity: May be harmful if swallowed and enters airways.

CMR effects
tert-Nonanethiol:
- Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
- Teratogenicity: Animal testing did not show any effects on fetal development.

Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: No toxicity to reproduction

Sulfole® 100 Mercaptan
Further information:
- Solvents may degrease the skin.

SECTION 12: Ecological information

Toxicity to fish

tert-Nonanethiol:
- No data available

tert-Dodecanethiol:
- LL50: > 100 mg/l
  Exposure time: 96 h
  Species: Danio rerio (Zebra Fish)
  static test Method: OECD Test Guideline 203
  No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates

tert-Nonanethiol:
- EC50: 0,090 mg/l
  Exposure time: 48 h
  Species: Daphnia magna (Water flea)
  Immobilization Method: OECD Test Guideline 202

tert-Dodecanethiol:
- EC50: > 0,056 mg/l
  Exposure time: 48 h
  Species: Daphnia magna (Water flea)
  semi-static Method: OECD Test Guideline 202
  No toxicity at the limit of solubility.

Toxicity to algae

tert-Nonanethiol:
- No data available

M-Factor
1,1-dimethylheptanethiol:
- 10

Toxicity to bacteria

tert-Dodecanethiol:
- NOEC: 8,6 mg/l
  Exposure time: 3 h
  Growth rate
  Respiration inhibition
  Method: OECD Test Guideline 209
NOEC: > 10 mg/l  
Exposure time: 3 h  
Growth rate  
Respiration inhibition  
Method: OECD Test Guideline 209

**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)**

tert-Dodecanethiol  NOEC: 0.0108 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
semi-static test  
Method: OECD Test Guideline 211  
No toxicity at the limit of solubility.

**Elimination information (persistence and degradability)**

**Bioaccumulation**

tert-Dodecanethiol  Species: Danio rerio (zebra fish)  
Exposure time: 15 d  
Bioconcentration factor (BCF): > 500 - < 1.950  
Method: OECD Test Guideline 305  
Biomagnification factor <1  
The product may be accumulated in organisms.

**Biodegradability**

This material is not expected to be readily biodegradable.

**Ecotoxicology Assessment**

**Acute aquatic toxicity**

tert-Dodecanethiol  No toxicity at the limit of solubility.

**Chronic aquatic toxicity**

tert-Dodecanethiol  May cause long lasting harmful effects to aquatic life.

**Toxicity Data on Soil**

tert-Dodecanethiol  Adsorbs on soil.

**Other organisms relevant to the environment**

tert-Dodecanethiol  No information available.

**Impact on Sewage Treatment**

tert-Dodecanethiol  No information available.

**Results of PBT assessment**

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

**Additional ecological information**

Very toxic to aquatic life with long lasting effects.
SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped. Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Product: The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.

Contaminated packaging: Empty remaining contents. Dispose of as unused product. Do not re-use empty containers. Do not burn, or use a cutting torch on, the empty drum.

For additional details, see the Exposure Scenario in the Annex portion.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
NA1993, COMBUSTIBLE LIQUID, N.O.S., (TERT-DODECANETHIOL, TERT-NONANETHIOL), III

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (TERT-NONANETHIOL), 9, III, (67 °C), MARINE POLLUTANT, (TERT-NONANETHIOL)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (TERT-NONANETHIOL), 9, III

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (TERT-NONANETHIOL), 9, III, (E)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (TERT-NONANETHIOL), 9, III
# SAFETY DATA SHEET

**Sulfole® 100 Mercaptan**  
Version 1.4  
Revision Date 2016-06-21

**ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)**  
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (TERT-NONANETHIOL), 9, III

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

## SECTION 15: Regulatory information

**National legislation**

| Major Accident Hazard Legislation | Update: Dangerous for the environment 9a  
|------------------------------------|------------------------------------------  
| Quantity 1: 100 t  
| Quantity 2: 200 t  
| Water contaminating class (Germany) | WGK 3 highly water endangering  

### Notification status

- **Europe REACH**: On the inventory, or in compliance with the inventory  
- **United States of America TSCA**: On the inventory, or in compliance with the inventory  
- **Canada DSL**: On the inventory, or in compliance with the inventory  
- **Australia AICS**: On the inventory, or in compliance with the inventory  
- **New Zealand NZIoC**: On the inventory, or in compliance with the inventory  
- **Japan ENCS**: On the inventory, or in compliance with the inventory  
- **Korea KECI**: Not in compliance with the inventory  
- **Philippines PICCS**: On the inventory, or in compliance with the inventory  
- **China IECSC**: On the inventory, or in compliance with the inventory

## SECTION 16: Other information

**NFPA Classification**  
- Health Hazard: 2  
- Fire Hazard: 2  
- Reactivity Hazard: 0  
- Health Hazard: 2  
- Fire Hazard: 2

**Further information**

- Legacy SDS Number: 34660
Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

<table>
<thead>
<tr>
<th>Key or legend to abbreviations and acronyms used in the safety data sheet</th>
<th>ACGIH</th>
<th>LD50</th>
<th>Lethal Dose 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>AICS</td>
<td>Australia, Inventory of Chemical Substances</td>
<td>LOAEL</td>
<td>Lowest Observed Adverse Effect Level</td>
</tr>
<tr>
<td>DSL</td>
<td>Canada, Domestic Substances List</td>
<td>NFPA</td>
<td>National Fire Protection Agency</td>
</tr>
<tr>
<td>NDSL</td>
<td>Canada, Non-Domestic Substances List</td>
<td>NIOSH</td>
<td>National Institute for Occupational Safety &amp; Health</td>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service</td>
<td>NZIoC</td>
<td>New Zealand Inventory of Chemicals</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration</td>
<td>NOAEL</td>
<td>No Observable Adverse Effect Level</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective Concentration 50%</td>
<td>NOEC</td>
<td>No Observed Effect Concentration</td>
</tr>
<tr>
<td>EGEST</td>
<td>EOSCA Generic Exposure Scenario Tool</td>
<td>OSHA</td>
<td>Occupational Safety &amp; Health Administration</td>
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<tr>
<td>EOSCA</td>
<td>European Oilfield Specialty Chemicals Association</td>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
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<td>EINECS</td>
<td>European Inventory of Existing Chemical Substances</td>
<td>PICCS</td>
<td>Philippines Inventory of Commercial Chemical Substances</td>
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<tr>
<td>MAK</td>
<td>Germany Maximum Concentration Values</td>
<td>PRNT</td>
<td>Presumed Not Toxic</td>
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<td>GHS</td>
<td>Globally Harmonized System</td>
<td>RCRA</td>
<td>Resource Conservation Recovery Act</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater Than or Equal To</td>
<td>STEL</td>
<td>Short-term Exposure Limit</td>
</tr>
<tr>
<td>IC50</td>
<td>Inhibition Concentration 50%</td>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act.</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
<td>TSCA</td>
<td>Toxic Substance Control Act</td>
</tr>
<tr>
<td>KECI</td>
<td>Korea, Existing Chemical Inventory</td>
<td>UVCB</td>
<td>Unknown or Variable Composition, Complex Reaction Products, and Biological Materials</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**H315** Causes skin irritation.

**H317** May cause an allergic skin reaction.

**H319** Causes serious eye irritation.

**H400** Very toxic to aquatic life.

**H410** Very toxic to aquatic life with long lasting effects.

**H413** May cause long lasting harmful effects to aquatic life.
## Annex

### 1. Short title of Exposure Scenario: **Manufacture**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector of use</td>
<td>SU3: Industrial Manufacturing (all)</td>
</tr>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td>PROC2: Use in closed, continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</td>
</tr>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
</tbody>
</table>

### 2.1 Contributing scenario controlling environmental exposure for: **ERC1: Manufacture of substances**

#### Environment factors not influenced by risk management

| Flow rate | 0 m³/d |
| Remarks   | Not relevant since there is no release to waste water (dry process). |

#### Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Local release to the environment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission or Release Factor: Air</td>
<td>0 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
<td>0 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
<td>0 %</td>
</tr>
<tr>
<td>Local release rate: Water</td>
<td>0 kg/day</td>
</tr>
<tr>
<td>Remarks</td>
<td>The waste of the substance is collected in a slop tank and treated as a waste by a dedicated contractor.</td>
</tr>
<tr>
<td>Local release rate: Air</td>
<td>0 kg/day</td>
</tr>
<tr>
<td>Remarks</td>
<td>Incineration of gases with efficiency 100%.</td>
</tr>
<tr>
<td>Local release rate: Soil</td>
<td>0 kg/day</td>
</tr>
<tr>
<td>Remarks</td>
<td>There is no direct exposure to soil.</td>
</tr>
</tbody>
</table>

#### Technical conditions and measures / Organizational measures

| Remarks | Not applicable |

#### Conditions and measures related to municipal sewage treatment plant

<table>
<thead>
<tr>
<th>Type of Sewage Treatment Plant</th>
<th>Municipal sewage treatment plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness (of a measure)</td>
<td>0 %</td>
</tr>
<tr>
<td>Remarks</td>
<td>Not relevant since there is no release to waste water (dry process).</td>
</tr>
</tbody>
</table>

### 2.2 Contributing scenario controlling worker exposure for: **PROC1: Use in closed process, no likelihood of exposure**

#### Product characteristics

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Frequency and duration of use

Exposure duration : < 4 h

Human factors not influenced by risk management

Exposed skin area : One hand face only (240 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Good general ventilation (3-5 air changes per hour)

Technical conditions and measures

Use product only in closed system.
Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

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

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, No (Effectiveness: 0 %)

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Product characteristics

Physical Form (at time of use) : Liquid substance
Process Temperature : <= 40 °C

Frequency and duration of use

Exposure duration : < 1 h

Human factors not influenced by risk management

Exposed skin area : Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor
Remarks : Good general ventilation (3-5 air changes per hour)

Technical conditions and measures

Closed continuous process with occasional controlled exposure
Local exhaust ventilation- inhalation:, Yes (Effectiveness: 90 %)
Local exhaust ventilation-dermal:, No (Effectiveness: 0 %)

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

Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

SDS Number:100000014209 17/46
### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** \( \leq 40 \, ^\circ C \)

### Frequency and duration of use
- **Exposure duration:** \(< 1 \text{ h}\)

### Human factors not influenced by risk management
- **Exposed skin area:** Two hands (960 cm²)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Good general ventilation (3-5 air changes per hour)

### Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: Yes (Effectiveness: 95 %)
- Local exhaust ventilation - dermal: Yes (Effectiveness: 95 %)

### Conditions and measures related to personal protection, hygiene and health evaluation
- **Eye Protection:** Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection:** No (Effectiveness: 0 %)
- **Dermal Protection:** Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** \( \leq 40 \, ^\circ C \)

### Frequency and duration of use
- **Exposure duration:** \(< 1 \text{ h}\)

### Human factors not influenced by risk management
- **Exposed skin area:** Palms of both hands (480 cm²)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Enhanced general ventilation (5-10 air changes per hour)

### Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)
- Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

### Conditions and measures related to personal protection, hygiene and health evaluation
- **Eye Protection:** Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection:** No (Effectiveness: 0 %)
- **Dermal Protection:** Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)
2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
- Physical Form (at time of use): Liquid substance
- Process Temperature: <= 40 °C

Frequency and duration of use
- Exposure duration: < 1 h

Human factors not influenced by risk management
- Exposed skin area: One hand face only (240 cm²)

Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Good general ventilation (3-5 air changes per hour)

Technical conditions and measures
- Local exhaust ventilation - inhalation: Yes, Carry out in a vented booth provided with laminar airflow. (Effectiveness: 99 %)
- Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartiment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC1</td>
<td>EUSES</td>
<td>Marine sediment</td>
<td></td>
<td></td>
<td>0,0004866 mg/kg dry weight (d.w.)</td>
<td>&lt; 0,01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td></td>
<td></td>
<td>0 mg/L</td>
<td>&lt; 0,01</td>
</tr>
</tbody>
</table>

ERC1: Manufacture of substances

Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,035 mg/m³</td>
<td>0,071</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,034 mg/kg/d</td>
<td>0,02</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,091</td>
<td></td>
</tr>
</tbody>
</table>

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**PROC2**: Use in closed process, no likelihood of exposure

**PROC2**: Use in closed, continuous process with occasional controlled exposure

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

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

**PROC15**: Use as laboratory reagent

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

Not applicable

1. **Short title of Exposure Scenario**: **Formulation**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process category</td>
<td><strong>PROC1</strong>: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td><strong>PROC2</strong>: Use in closed, continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td></td>
<td><strong>PROC3</strong>: Use in closed batch process (synthesis or formulation)</td>
</tr>
<tr>
<td></td>
<td><strong>PROC4</strong>: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td><strong>PROC8a</strong>: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</td>
</tr>
<tr>
<td></td>
<td><strong>PROC8b</strong>: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
</tbody>
</table>
## 2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

### Environment factors not influenced by risk management
- **Flow rate**: 18,000 m³/d

### Other given operational conditions affecting environmental exposure
- **Local release to the environment**
  - **Emission or Release Factor: Air**: 0.1 %
  - **Emission or Release Factor: Water**: 0.3 %
  - **Emission or Release Factor: Soil**: 0.01 %
- **Local release rate: Air**: 0.1 kg/day
- **Local release rate: Water**: 0.3 kg/day
- **Local release rate: Soil**: 0.01 kg/day

### Technical conditions and measures / Organizational measures
- **Remarks**: Sludge should be incinerated, contained or reclaimed.
- **Remarks**: No application of sewage sludge to soil

### 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
- **Effectiveness (of a measure)**: 96 %
- **Sludge Treatment**: Not applicable

## 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

### Product characteristics
- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: <= 40 °C

### Frequency and duration of use
- **Exposure duration**: < 4 h

### Human factors not influenced by risk management
- **Exposed skin area**: One hand face only (240 cm²)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor**: Indoor
- **Remarks**: Good general ventilation (3-5 air changes per hour)
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**Revision Date** 2016-06-21

#### Technical conditions and measures

Use product only in closed system.
Local exhaust ventilation- inhalation.: No (Effectiveness: 0 %)

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

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, No (Effectiveness: 0 %)

#### 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
</tr>
<tr>
<td>Process Temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
</tbody>
</table>

#### Technical conditions and measures

Closed continuous process with occasional controlled exposure
Local exhaust ventilation- inhalation.: No (Effectiveness: 0 %)

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

Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

#### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

<table>
<thead>
<tr>
<th>Product characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
</tr>
<tr>
<td>Process Temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
</tr>
</tbody>
</table>

SDS Number:100000014209
Remarks: Good general ventilation (3-5 air changes per hour)

Technical conditions and measures
Closed continuous process with occasional controlled exposure
Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

2.2 Contributing scenario controlling worker exposure for: PROC4, PROC9: Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
| Physical Form (at time of use) | Liquid substance |
| Process Temperature | <= 40 °C |

Frequency and duration of use
| Exposure duration | < 1 h |

Human factors not influenced by risk management
Exposed skin area: Palms of both hands (480 cm²)

Other operational conditions affecting workers exposure
Outdoor / Indoor: Indoor
Remarks: Enhanced general ventilation (5-10 air changes per hour)

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

Product characteristics
| Physical Form (at time of use) | Liquid substance |
| Process Temperature | <= 40 °C |

Frequency and duration of use
## Product characteristics

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Temperature</td>
<td>(\leq 40,^{\circ}\mathrm{C})</td>
</tr>
</tbody>
</table>

## Frequency and duration of use

| Exposure duration | \(< 1\,\text{h}\) |

## Human factors not influenced by risk management

| Exposed skin area | Two hands (960 cm\(^2\)) |

## Other operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Outdoor / Indoor</th>
<th>Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Enhanced general ventilation (5-10 air changes per hour)</td>
</tr>
</tbody>
</table>

## Technical conditions and measures

- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation- inhalation; No (Effectiveness: 0 %)

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

- Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection, No (Effectiveness: 0 %)
- Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

## Product characteristics

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Temperature</td>
<td>(\leq 40,^{\circ}\mathrm{C})</td>
</tr>
</tbody>
</table>

## Frequency and duration of use

| Exposure duration | \(< 1\,\text{h}\) |

## Human factors not influenced by risk management

| Exposed skin area | Two hands (960 cm\(^2\)) |

## Other operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Outdoor / Indoor</th>
<th>Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Enhanced general ventilation (5-10 air changes per hour)</td>
</tr>
</tbody>
</table>

## Technical conditions and measures

- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation- inhalation; No (Effectiveness: 0 %)

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

- Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection, No (Effectiveness: 0 %)
- Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent
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**Product characteristics**
- Physical Form (at time of use): Liquid substance
- Process Temperature: \( \leq 40 \, ^\circ C \)

**Frequency and duration of use**
- Exposure duration: \(< 1 \, h\)

**Human factors not influenced by risk management**
- Exposed skin area: One hand face only (240 cm\(^2\))

**Other operational conditions affecting workers exposure**
- Outdoor / Indoor: Indoor
  - Remarks: Enhanced general ventilation (5-10 air changes per hour)

**Technical conditions and measures**
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

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

- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

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

**Environment**

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC2</td>
<td>EUSES</td>
<td>Freshwater sediment</td>
<td></td>
<td>(0.253 , \text{mg/kg dry weight (d.w.)})</td>
<td>0.084</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td>(0.025 , \text{mg/kg dry weight (d.w.)})</td>
<td>0.084</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td></td>
<td>(0.006 , \text{mg/L})</td>
<td>(&lt; 0.01)</td>
<td></td>
</tr>
</tbody>
</table>

ERC2: Formulation of preparations

**Workers/Consumers**

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>(0.004 , \text{mg/m}^3)</td>
<td>(&lt; 0.01)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>(0.003 , \text{mg/kg/d})</td>
<td>(&lt; 0.01)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>(\text{--})</td>
<td>(&lt; 0.01)</td>
<td></td>
</tr>
<tr>
<td>PROC2</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>(0.354 , \text{mg/m}^3)</td>
<td>(0.708)</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number:100000014209  25/46
### 1. Short title of Exposure Scenario: **Use in polymer processing – industrial**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC3</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,354 mg/m³</td>
<td>0,014 mg/kg/d</td>
<td>0,724</td>
<td>0,016</td>
<td>0,708</td>
</tr>
<tr>
<td>PROC4, PROC9</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,137 mg/kg/d</td>
<td>0,506</td>
<td>0,081</td>
<td>0,587</td>
</tr>
<tr>
<td>PROC8a</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,274 mg/kg/d</td>
<td>0,506</td>
<td>0,161</td>
<td>0,667</td>
</tr>
<tr>
<td>PROC8b</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,274 mg/kg/d</td>
<td>0,506</td>
<td>0,161</td>
<td>0,667</td>
</tr>
<tr>
<td>PROC15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,007 mg/kg/d</td>
<td>0,506</td>
<td>0,081</td>
<td>0,51</td>
</tr>
</tbody>
</table>

**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

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

**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

**PROC15:** Use as laboratory reagent

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

- Not applicable
Main User Groups: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use: SU11: Manufacture of rubber products

Process category: PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15: Use as laboratory reagent

Environmental release category: ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Further information: Chain Transfer Agent for the production of styrene butadiene latex for rubber and paper coating, nitrile rubber, acrylonitrile butadiene styrene (ABS) and also for the production of expandable polystyrene.

2.1 Contributing scenario controlling environmental exposure for: ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Environment factors not influenced by risk management
Flow rate: 400,000 m³/d

Other given operational conditions affecting environmental exposure
Local release to the environment
Emission or Release Factor: Air: 0 %
Emission or Release Factor: Water: 0.1 %
Emission or Release Factor: Soil: 0.025 %
Local release rate: Water: 2.5 kg/day
Local release rate: Air: 0 kg/day

Technical conditions and measures / Organizational measures
Remarks: Sludge should be incinerated, contained or reclaimed.
Remarks: No application of sewage sludge to soil

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: 10,000 m³/d
Effectiveness (of a measure): 96 %
### Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

#### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

#### Frequency and duration of use
- **Exposure duration:** < 4 h

#### Human factors not influenced by risk management
- **Exposed skin area:** One hand face only (240 cm²)

#### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Good general ventilation (3-5 air changes per hour)

#### Technical conditions and measures
- Use product only in closed system.
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: No (Effectiveness: 0 %)

### Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

#### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

#### Frequency and duration of use
- **Exposure duration:** < 4 h

#### Human factors not influenced by risk management
- **Exposed skin area:** Palms of both hands (480 cm²)

#### Other operational conditions affecting workers exposure
- **Outdoor / Indoor:** Indoor
- **Remarks:** Good general ventilation (3-5 air changes per hour)

#### Technical conditions and measures
- Closed continuous process with occasional controlled exposure
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific
## 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

### Product characteristics
- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: \(\leq 40 ^\circ C\)

### Frequency and duration of use
- **Exposure duration**: \(< 1\ h\)

### Human factors not influenced by risk management
- **Exposed skin area**: One hand face only (240 cm²)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor**: Indoor
- **Remarks**: Good general ventilation (3-5 air changes per hour)

### Technical conditions and measures
- Closed continuous process with occasional controlled exposure
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

### Conditions and measures related to personal protection, hygiene and health evaluation
- **Eye Protection**: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection**: No (Effectiveness: 0 %)
- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

## 2.2 Contributing scenario controlling worker exposure for: PROC4, PROC9: Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

### Product characteristics
- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: \(\leq 40 ^\circ C\)

### Frequency and duration of use
- **Exposure duration**: \(< 1\ h\)

### Human factors not influenced by risk management
- **Exposed skin area**: Palms of both hands (480 cm²)

### Other operational conditions affecting workers exposure
- **Outdoor / Indoor**: Indoor
- **Remarks**: Enhanced general ventilation (5-10 air changes per hour)

### Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation- inhalation: No (Effectiveness: 0 %)
## Conditions and measures related to personal protection, hygiene and health evaluation

**Eye Protection:** Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact.

**Respiratory Protection:** No (Effectiveness: 0%)

**Dermal Protection:** Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80%)

### 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

**Product characteristics**
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

**Frequency and duration of use**
- **Exposure duration:** < 15 min

**Human factors not influenced by risk management**
- **Exposed skin area:** Two hands (960 cm²)

**Other operational conditions affecting workers exposure**
- **Outdoor / Indoor:** Indoor
- **Remarks:** Enhanced general ventilation (5-10 air changes per hour)

**Technical conditions and measures**
- Local exhaust ventilation- inhalation; No (Effectiveness: 0%)

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

**Product characteristics**
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

**Frequency and duration of use**
- **Exposure duration:** < 1 h

**Human factors not influenced by risk management**
- **Exposed skin area:** Two hands (960 cm²)
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Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Enhanced general ventilation (5-10 air changes per hour)

Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
- Physical Form (at time of use): Liquid substance
- Process Temperature: <= 40 °C

Frequency and duration of use
- Exposure duration: < 1 h

Human factors not influenced by risk management
- Exposed skin area: One hand face only (240 cm²)

Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Enhanced general ventilation (5-10 air changes per hour)

Technical conditions and measures
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>ERC6d</th>
<th>EUSES</th>
<th>Freshwater</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.106 mg/kg</td>
<td>0.035</td>
</tr>
</tbody>
</table>

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### Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,004 mg/m³</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,003 mg/kg/d</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td>PROC2</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,354 mg/m³</td>
<td>0,708</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,027 mg/kg/d</td>
<td>0,016</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,724</td>
<td></td>
</tr>
<tr>
<td>PROC3</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,354 mg/m³</td>
<td>0,708</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,014 mg/kg/d</td>
<td>&lt; 0,01</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<td>0,716</td>
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</tr>
<tr>
<td>PROC4, PROC9</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,137 mg/kg/d</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
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<td>0,587</td>
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</tr>
<tr>
<td>PROC8a</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,274 mg/kg/d</td>
<td>0,161</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,667</td>
<td></td>
</tr>
<tr>
<td>PROC8b</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,274 mg/kg/d</td>
<td>0,161</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,667</td>
<td></td>
</tr>
<tr>
<td>PROC15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,007 mg/kg/d</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,51</td>
<td></td>
</tr>
</tbody>
</table>

**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)
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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)

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

PROC15: Use as laboratory reagent

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

Not applicable

#### 1. Short title of Exposure Scenario: **Lubricants - Industrial**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>Sector of use</th>
<th>Process category</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</td>
<td>SU0: Other</td>
<td>PROC1: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC2: Use in closed, continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC3: Use in closed batch process (synthesis or formulation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
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<td></td>
<td></td>
<td>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
</tbody>
</table>

| Environmental release category | ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) |

#### 2.1 Contributing scenario controlling environmental exposure for: **ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)**

**Environment factors not influenced by risk management**

| Flow rate | 400.000 m3/d |

**Other given operational conditions affecting environmental exposure**

| Emission or Release Factor: Air | 0,001 % |
| Emission or Release Factor: Water | 0,3 % |
| Emission or Release Factor: Soil | 0,001 % |

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### Technical conditions and measures / Organizational measures

**Local release rate:**
- **Air:** 0.025 kg/day
- **Water:** 7.5 kg/day

**Remarks:**
- Sludge should be incinerated, contained or reclaimed.
- No application of sewage sludge to soil

### 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:** 10,000 m³/d
- **Sludge Treatment:** Not applicable

### 2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

**Product characteristics**
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

**Frequency and duration of use**
- **Exposure duration:** < 15 min

**Human factors not influenced by risk management**
- **Exposed skin area:** One hand face only (240 cm²)

**Other operational conditions affecting workers exposure**
- **Outdoor / Indoor:** Indoor
- **Remarks:** Good general ventilation (3-5 air changes per hour)

**Technical conditions and measures**
- Use product only in closed system.
- Local exhaust ventilation- inhalation:, No (Effectiveness: 0 %)
- Local exhaust ventilation- dermal:, No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**
- **Eye Protection:** Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection:** No (Effectiveness: 0 %)
- **Dermal Protection:** No (Effectiveness: 0 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

**Product characteristics**
- **Physical Form (at time of use):** Liquid substance
- **Process Temperature:** <= 40 °C

**Frequency and duration of use**
- **Exposure duration:** < 15 min

**Human factors not influenced by risk management**
- **Exposed skin area:** Palms of both hands (480 cm²)

**Other operational conditions affecting workers exposure**
### Technical conditions and measures

Closed continuous process with occasional controlled exposure
Local exhaust ventilation- inhalation: Yes (Effectiveness: 90 %)
Local exhaust ventilation-dermal: No (Effectiveness: 0 %)

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

- **Eye Protection**: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection**: Yes, Respirator with APF of 10 (Effectiveness: 90 %)
- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

#### Product characteristics

- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: <= 40 °C

#### Frequency and duration of use

- **Exposure duration**: < 15 min

#### Human factors not influenced by risk management

- **Exposed skin area**: One hand face only (240 cm²)

#### Other operational conditions affecting workers exposure

- **Outdoor / Indoor**: Indoor
- **Remarks**: Good general ventilation (3-5 air changes per hour)

### Technical conditions and measures

Closed continuous process with occasional controlled exposure
Local exhaust ventilation- inhalation: Yes (Effectiveness: 90 %)
Local exhaust ventilation-dermal: No

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

- **Eye Protection**: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection**: Yes, Respirator with APF of 10 (Effectiveness: 90 %)
- **Dermal Protection**: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

#### Product characteristics

- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: <= 40 °C

#### Frequency and duration of use

- **Exposure duration**: < 15 min

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<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
<td>Palms of both hands (480 cm²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Remarks</td>
<td>Good general ventilation (3-5 air changes per hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-closed process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation- inhalation; Yes (Effectiveness: 90 %)</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation-dermal; No (Effectiveness: 0 %)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Protection,Yes,chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact</td>
<td></td>
</tr>
<tr>
<td>Respiratory Protection, Yes, Respirator with APF of 10 (Effectiveness: 90 %)</td>
<td></td>
</tr>
<tr>
<td>Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 90 %)</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
<td>Liquid substance</td>
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<tr>
<td>Process Temperature</td>
<td>&lt;= 40 °C</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
<td>&lt; 15 min</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Human factors not influenced by risk management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed skin area</td>
<td>Two hands (960 cm²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other operational conditions affecting workers exposure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor / Indoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Remarks</td>
<td>Good general ventilation (3-5 air changes per hour)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Local exhaust ventilation- inhalation; Yes (Effectiveness: 90 %)</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation-dermal; No (Effectiveness: 0 %)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to personal protection, hygiene and health evaluation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Protection,Yes,chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact</td>
<td></td>
</tr>
<tr>
<td>Respiratory Protection, Yes, Respirator with APF of 10 (Effectiveness: 90 %)</td>
<td></td>
</tr>
<tr>
<td>Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Number:100000014209</td>
<td>36/46</td>
</tr>
</tbody>
</table>
# Physical Form (at time of use)
- Liquid substance

# Process Temperature
- <= 40 °C

## Frequency and duration of use
- Exposure duration: < 15 min

## Human factors not influenced by risk management
- Exposed skin area: Two hands (960 cm²)

## Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Good general ventilation (3-5 air changes per hour)

## Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: Yes (Effectiveness: 95 %)
- Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

## Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: Yes, Respirator with APF of 10 (Effectiveness: 90 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 95 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

## Physical Form (at time of use)
- Liquid substance

## Process Temperature
- <= 40 °C

## Frequency and duration of use
- Exposure duration: < 15 min

## Human factors not influenced by risk management
- Exposed skin area: Palms of both hands (480 cm²)

## Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Good general ventilation (3-5 air changes per hour)

## Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: Yes (Effectiveness: 90 %)
- Local exhaust ventilation - dermal: No (Effectiveness: 0 %)

## Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: Yes, Respirator with APF of 10 (Effectiveness: 90 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 90 %)
2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

**Product characteristics**

Physical Form (at time of use) : Liquid substance  
Process Temperature : <= 40 °C

**Frequency and duration of use**

Exposure duration : < 15 min

**Human factors not influenced by risk management**

Exposed skin area : One hand face only (240 cm²)

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Good general ventilation (3-5 air changes per hour)

**Technical conditions and measures**

Local exhaust ventilation- inhalation:, Yes (Effectiveness: 90 %)  
Local exhaust ventilation- dermal:, No (Effectiveness: 0 %)

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

Eye Protection,Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact

Respiratory Protection, Yes, Respirator with APF of 10 (Effectiveness: 90 %)  
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Effectiveness: 80 %)

3. Exposure estimation and reference to its source

**Environment**

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartiment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC6a</td>
<td>EUSES</td>
<td>Freshwater sediment</td>
<td></td>
<td>0,307 mg/kg dry weight (d.w.)</td>
<td>0,102</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td></td>
<td>0,124 mg/kg dry weight (d.w.)</td>
<td>0,414</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sewage treatment plant</td>
<td></td>
<td>0,031 mg/L</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
</tbody>
</table>

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

**Workers/Consumers**

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,006 mg/m³</td>
<td>0,012</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,034 mg/kg/d</td>
<td>0,02</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,032</td>
<td></td>
</tr>
<tr>
<td>PROC2</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation,</td>
<td>0,006 mg/m³</td>
<td>0,012</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number:100000014209 38/46
<table>
<thead>
<tr>
<th>PROC</th>
<th>ECETOC TRA</th>
<th>Modified</th>
<th>long-term – systemic</th>
</tr>
</thead>
</table>
| PROC3  | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.018 mg/m³ 0.035  
|        |            |          | Worker – dermal, long-term – systemic | 0.138 mg/kg/d 0.081  
|        |            |          | Worker – long-term – systemic Combined routes | 0.117  
| PROC4  | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.03 mg/m³ 0.059  
|        |            |          | Worker – dermal, long-term – systemic | 0.686 mg/kg/d 0.404  
|        |            |          | Worker – long-term – systemic Combined routes | 0.463  
| PROC8a | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.059 mg/m³ 0.118  
|        |            |          | Worker – dermal, long-term – systemic | 0.686 mg/kg/d 0.403  
|        |            |          | Worker – long-term – systemic Combined routes | 0.521  
| PROC8b | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.015 mg/m³ 0.03  
|        |            |          | Worker – dermal, long-term – systemic | 0.686 mg/kg/d 0.403  
|        |            |          | Worker – long-term – systemic Combined routes | 0.433  
| PROC9  | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.03 mg/m³ 0.059  
|        |            |          | Worker – dermal, long-term – systemic | 0.686 mg/kg/d 0.404  
|        |            |          | Worker – long-term – systemic Combined routes | 0.463  
| PROC15 | ECETOC TRA | Modified | Worker – inhalation, long-term – systemic | 0.03 mg/m³ 0.059  
|        |            |          | Worker – dermal, long-term – systemic | 0.068 mg/kg/d 0.04  
|        |            |          | Worker – long-term – systemic Combined routes | 0.099  

PROC1: Use in closed process, no likelihood of exposure  
PROC2: Use in closed, continuous process with occasional controlled exposure  
PROC3: Use in closed batch process (synthesis or formulation)  
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises  
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities  
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities  
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)  
PROC15: Use as laboratory reagent
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Not applicable

1. Short title of Exposure Scenario: **Use in mining – industrial**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector of use</td>
<td>SU2a: Mining, (without offshore industries)</td>
</tr>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure</td>
</tr>
<tr>
<td></td>
<td>PROC2: Use in closed, continuous process with occasional controlled exposure</td>
</tr>
<tr>
<td></td>
<td>PROC3: Use in closed batch process (synthesis or formulation)</td>
</tr>
<tr>
<td></td>
<td>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental release category</th>
<th>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</th>
</tr>
</thead>
</table>

Further information: Used effectively as a secondary/scavenger collector for base metal sulfides.

2.1 Contributing scenario controlling environmental exposure for: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Environment factors not influenced by risk management
Flow rate: 18.000 m3/d

Other given operational conditions affecting environmental exposure
Local release to the environment
Emission or Release Factor: Air: 0 %
Emission or Release Factor: Water: 0.1 %
Emission or Release Factor: Soil: 0.025 %
Local release rate: Air: 0 kg/day
Local release rate: Water: 1 kg/day

Technical conditions and measures / Organizational measures
Remarks: Not applicable

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
Sulfole® 100 Mercaptan

Version 1.4

Revision Date 2016-06-21

| Effectiveness (of a measure) | 96 % |

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

**Product characteristics**
- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: <= 40 °C

**Frequency and duration of use**
- **Exposure duration**: < 4 h

**Human factors not influenced by risk management**
- **Exposed skin area**: One hand face only (240 cm²)

**Other operational conditions affecting workers exposure**
- **Outdoor / Indoor**: Indoor
- **Remarks**: Good general ventilation (3-5 air changes per hour)

**Technical conditions and measures**
- **Use product only in closed system.**
- **Local exhaust ventilation - inhalation**: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**
- **Respiratory Protection**: No (Effectiveness: 0 %)
- **Dermal Protection**: No (Effectiveness: 0 %)

2.2 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

**Product characteristics**
- **Physical Form (at time of use)**: Liquid substance
- **Process Temperature**: <= 40 °C

**Frequency and duration of use**
- **Exposure duration**: < 4 h

**Human factors not influenced by risk management**
- **Exposed skin area**: Palms of both hands (480 cm²)

**Other operational conditions affecting workers exposure**
- **Outdoor / Indoor**: Indoor
- **Remarks**: Good general ventilation (3-5 air changes per hour)

**Technical conditions and measures**
- **Closed continuous process with occasional controlled exposure**
- **Local exhaust ventilation- inhalation**: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**
- **Eye Protection**: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection**: No (Effectiveness: 0 %)
## Sulfole® 100 Mercaptan

### Version 1.4

Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

#### Product characteristics
- Physical Form (at time of use): Liquid substance
- Process Temperature: \( \leq 40 \, ^\circ\text{C} \)

#### Frequency and duration of use
- Exposure duration: \(< 1 \, \text{h}\)

#### Human factors not influenced by risk management
- Exposed skin area: One hand face only (240 cm²)

#### Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Good general ventilation (3-5 air changes per hour)

#### Technical conditions and measures
- Closed batch process with occasional controlled exposure.
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection, No (Effectiveness: 0 %)
- Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

#### Product characteristics
- Physical Form (at time of use): Liquid substance
- Process Temperature: \( \leq 40 \, ^\circ\text{C} \)

#### Frequency and duration of use
- Exposure duration: \(< 1 \, \text{h}\)

#### Human factors not influenced by risk management
- Exposed skin area: Palms of both hands (480 cm²)

#### Other operational conditions affecting workers exposure
- Outdoor / Indoor: Indoor
- Remarks: Enhanced general ventilation (5-10 air changes per hour)

#### Technical conditions and measures
- Semi-closed process with occasional controlled exposure
- Local exhaust ventilation - inhalation: No (Effectiveness: 0 %)

#### Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact.

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

**Product characteristics**
- Physical Form (at time of use): Liquid substance
- Process Temperature: \( \leq 40 ^\circ C \)

**Frequency and duration of use**
- Exposure duration: \(< 15 \text{ min} \)

**Human factors not influenced by risk management**
- Exposed skin area: Two hands (960 cm\(^2\))

**Other operational conditions affecting workers exposure**
- Outdoor / Indoor: Indoor
- Remarks: Enhanced general ventilation (5-10 air changes per hour)

**Technical conditions and measures**
- Local exhaust ventilation- inhalation: No (Effectiveness: 0 %)

**Conditions and measures related to personal protection, hygiene and health evaluation**
- Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact.

- Respiratory Protection, No (Effectiveness: 0 %)
- Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness: 80 %)

### 2.2 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

**Product characteristics**
- Physical Form (at time of use): Liquid substance
- Process Temperature: \( \leq 40 ^\circ C \)

**Frequency and duration of use**
- Exposure duration: \(< 1 \text{ h} \)

**Human factors not influenced by risk management**
- Exposed skin area: Two hands (960 cm\(^2\))

**Other operational conditions affecting workers exposure**
- Outdoor / Indoor: Indoor
- Remarks: Enhanced general ventilation (5-10 air changes per hour)
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Version 1.4

Revision Date 2016-06-21

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation- inhalation; No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

2.2 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics
Physical Form (at time of use) : Liquid substance
Process Temperature : \( \leq 40 ^\circ \text{C} \)

Frequency and duration of use
Exposure duration : \(< 1 \text{ h}\)

Human factors not influenced by risk management
Exposed skin area : Palms of both hands (480 cm2)

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor
Remarks : Enhanced general ventilation (5-10 air changes per hour)

Technical conditions and measures
Semi-closed process with occasional controlled exposure
Local exhaust ventilation- inhalation; No (Effectiveness: 0 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact

Respiratory Protection, No (Effectiveness: 0 %)
Dermal Protection, Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC6a</td>
<td>EUSES</td>
<td></td>
<td>Freshwater sediment</td>
<td>0.83 mg/kg dry weight (d.w.)</td>
<td>0.277</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.083 mg/kg dry weight (d.w.)</td>
<td>0.277</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sewage</td>
<td>0.021 mg/L</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000014209 44/46
## Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.004 mg/m³</td>
<td>&lt; 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.003 mg/kg/d</td>
<td>&lt; 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>&lt; 0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC2: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.354 mg/m³</td>
<td>0.708</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.027 mg/kg/d</td>
<td>0.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.724</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.354 mg/m³</td>
<td>0.708</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.014 mg/kg/d</td>
<td>&lt; 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.716</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC4: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.253 mg/m³</td>
<td>0.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.137 mg/kg/d</td>
<td>0.081</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.587</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8a: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.235 mg/m³</td>
<td>0.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.274 mg/kg/d</td>
<td>0.161</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.667</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8b: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.253 mg/m³</td>
<td>0.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.274 mg/kg/d</td>
<td>0.161</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.667</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC9: ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.253 mg/m³</td>
<td>0.506</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.137 mg/kg/d</td>
<td>0.081</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)

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

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Not applicable