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

Product information

Product Name : Sulfolane, Electronic Grade

Material : 1092834, 1072474, 1101562, 1074221, 1102313, 1069532, 1101536, 1024650, 1024652, 1024651, 1105024, 1105023

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Legal Entity Registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>126-33-0 204-783-1 016-031-00-8</td>
<td>Chevron Phillips Chemicals International NV 01-2119565139-32-0000</td>
</tr>
</tbody>
</table>

Relevant Identified Uses : Distribution

Supported : Use as an aromatics extraction solvent - industrial

Use in acid gas purification – industrial

Formulation

Use as a cleaning agent – 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:
SAFETY DATA SHEET

Sulfolane, Electronic Grade

Version 3.4

Revision Date 2017-06-26

Transport:
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: CHEMWATCH (+61 2 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

Responsible Department: Product Safety and Toxicology Group
E-mail address: SDS@CPChem.com
Website: www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Acute toxicity, Category 4
H302: Harmful if swallowed.

Reproductive toxicity, Category 1B
H360: May damage fertility or the unborn child.

Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms:

Signal Word: Danger

Hazard Statements:
H302: Harmful if swallowed.
H360: May damage fertility or the unborn child.

Precautionary Statements:

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Hazardous ingredients which must be listed on the label:
- 126-33-0 Sulfolane

Additional Labeling:
Restricted to professional users.

SDS Number: 100000013627 2/37
SECTION 3: Composition/information on ingredients

Synonyms: E.G. Sulfolane
Tetramethylene sulfone
Tetrahydrothiopehen-1, 1-dioxide
Sulfolane-E
Sulfolane-K

Molecular formula: Mixture

Mixtures

Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>126-33-0</td>
<td>204-783-1</td>
<td>Acute Tox. 4; H302</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td></td>
<td>016-031-00-8</td>
<td>Repr. 1B; H360</td>
<td></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. 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 eye contact: Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed: Induce vomiting immediately and call a physician. Keep respiratory tract clear. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: Firefighting measures

Flash point: 166 °C (331 °F)
Method: Cleveland Open Cup

Autoignition temperature: No data available

Unsuitable extinguishing media: High volume water jet.
Safsolane, Electronic Grade

SECTION 6: Accidental release measures

Environmental precautions: 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: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7: Handling and storage

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

Advice on safe handling: Do not breathe vapors/dust. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion: Normal measures for preventive fire protection.

Storage

Requirements for storage areas and containers: Keep container tightly closed in a dry and well-ventilated place. Electrical installations / working materials must comply with the technological safety standards.

SECTION 8: Exposure controls/personal protection

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Basis</th>
<th>Value</th>
<th>Control parameters</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>Manufacturer</td>
<td>TWA</td>
<td>0.37 ppm.</td>
<td></td>
</tr>
</tbody>
</table>

LT

<table>
<thead>
<tr>
<th>Komponentai</th>
<th>Pagrindas, bazė</th>
<th>Verté</th>
<th>Kontrolės parametrai</th>
<th>Pastaba</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>LT OEL</td>
<td>IPRD</td>
<td>40 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

DNEL

: Routes of exposure: Skin contact
  Potential health effects: Chronic effects, Systemic effects

SDS Number: 100000013627
Sulfolane, Electronic Grade

Value: 7,8 mg/kg

DNEL: Routes of exposure: Inhalation
Potential health effects: Chronic effects, Systemic effects
Value: 9 mg/m3

PNEC: Fresh water
Value: 0,1 mg/l

PNEC: Sea water
Value: 0,01 mg/l

PNEC: Fresh water sediment
Value: 0,449 mg/kg

PNEC: Sea sediment
Value: 0,0449 mg/kg

PNEC: Soil
Value: 0,03104 mg/kg

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 Dusts and Mists / P100. 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.

Skin and body protection: Choose body protection according to the amount and concentration of the dangerous substance at the work place. Wear as appropriate: Protective suit. Safety shoes.

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
### SECTION 9: Physical and chemical properties

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th><strong>Appearance</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
</tr>
</tbody>
</table>

**Safety data**

<table>
<thead>
<tr>
<th><strong>Flash point</strong></th>
<th>166 °C (331 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Cleveland Open Cup</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>no</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Thermal decomposition</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>Mixture</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>7 - 10</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Pour point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>100 - 288 °C (212 - 550 °F)</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.26</td>
</tr>
<tr>
<td></td>
<td>at 30 °C (86 °F)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Partly soluble</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative vapor density</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(Air = 1.0)</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Percent volatile</td>
<td>&gt; 99 %</td>
</tr>
</tbody>
</table>
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**: No data available.
- **Materials to avoid**: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
- **Thermal decomposition**: Not applicable
- **Hazardous decomposition products**: Carbon oxides, Sulfur oxides

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

SECTION 11: Toxicological information

**Sulfolane, Electronic Grade**

**Acute oral toxicity**: Acute toxicity estimate: 515.46 mg/kg
Method: Calculation method

**Acute inhalation toxicity**

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50 (mg/l)</th>
<th>Exposure time</th>
<th>Species</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>&gt; 12</td>
<td>4 h</td>
<td>Rat</td>
<td></td>
</tr>
</tbody>
</table>

An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

<table>
<thead>
<tr>
<th>Substance</th>
<th>LC50 (mg/m³)</th>
<th>Exposure time</th>
<th>Species</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>&gt; 12000</td>
<td>4 h</td>
<td>Rat</td>
<td></td>
</tr>
</tbody>
</table>

**Acute dermal toxicity**

<table>
<thead>
<tr>
<th>Substance</th>
<th>LD50 (mg/kg)</th>
<th>Species</th>
<th>Method</th>
</tr>
</thead>
</table>

**Skin irritation**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Skin irritation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfolane</td>
<td>No skin irritation</td>
</tr>
</tbody>
</table>

**Eye irritation**
Sulfolane, Electronic Grade

Sensitization
Sulfolane: Did not cause sensitization on laboratory animals.

Repeated dose toxicity
Sulfolane: Species: Rat
Application Route: Oral
Dose: 60, 200, 700 mg/kg bw/day
Exposure time: 28 days
Number of exposures: Daily
NOEL: 200 mg/kg bw/day
Lowest observable effect level: 700 mg/kg bw/day

Species: Rat
Application Route: Inhalation
Dose: 2.8, 4.0, 20 mg/m³
Exposure time: 90-110 days
Number of exposures: 23 hrs/d, 7d/wk
NOEL: 20 mg/m³

Reproductive toxicity
Sulfolane: Species: Rat
Sex: female
Application Route: oral gavage
Dose: 60, 200, 700 mg/kg
Number of exposures: Daily
Test period: 2 wk premating to lactation D4
Method: OECD Guideline 421
NOAEL Parent: 200 mg/kg bw/day
NOAEL F1: 60 mg/kg bw/day
Decrease birth index and number of pups

Developmental Toxicity
Sulfolane: Species: Rat
Application Route: oral gavage
Dose: 60, 200, 700 mg/kg
Number of exposures: Daily
Test period: 2 wk premating to lactation D4
NOAEL Teratogenicity: 60 mg/kg bw/day
NOAEL Maternal: 200 mg/kg bw/day

Species: Rat
Application Route: oral gavage
Dose: 100, 200, 500 mg/kg/day
Number of exposures: Daily
Test period: GD 1 - 19
NOAEL Teratogenicity: 200 mg/kg
NOAEL Maternal: 100 mg/kg
May damage the unborn child.

Sulfolane, Electronic Grade
Aspiration toxicity: No aspiration toxicity classification.
**CMR effects**

Sulfolane : Carcinogenicity: Not available
Mutagenicity: Did not show mutagenic effects in animal experiments.
Teratogenicity: Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments
Reproductive toxicity: No toxicity to reproduction

**Sulfolane, Electronic Grade**

**Further information** : No data available.

---

**SECTION 12: Ecological information**

**Toxicity to fish**

Sulfolane : LC50: > 100 mg/l
Exposure time: 96 h
Species: Oryzias latipes (Orange-red killifish)
static test Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates**

Sulfolane : EC50: 852 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
static test Method: OECD Test Guideline 202

**Toxicity to algae**

Sulfolane : EC50: 500 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

NOEC: 171 mg/l
Exposure time: 72 h
Species: Pseudokirchneriella subcapitata (green algae)
Method: OECD Test Guideline 201

**Bioaccumulation**

Sulfolane : Bioconcentration factor (BCF): < 1.3
This material is not expected to bioaccumulate.

**Biodegradability**

Sulfolane : Result: Not readily biodegradable.
10.1 %
Testing period: 14 d
Method: OECD Test Guideline 301C
Ecotoxicology Assessment

Results of PBT assessment
Sulfolane : Non-classified vPvB substance, Non-classified PBT substance

Additional ecological information : No data available

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 : Do not dispose of waste into sewer. 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.

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)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR
TRANSPORTATION BY THIS AGENCY.

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

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

SECTION 15: Regulatory information

National legislation
Chemical Safety Assessment
Ingredients: tetrahydrothiophene 1,1-dioxide
A Chemical Safety Assessment has been carried out for this substance.

Major Accident Hazard Legislation: 96/82/EC Update: 2003
Directive 96/82/EC does not apply

Notification status
Europe REACH: On the inventory, or in compliance with the inventory
United States of America (USA) 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: On the inventory, or 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: 1
Fire Hazard: 1
Reactivity Hazard: 0

SDS Number: 100000013627 11/37
Further information

 Legacy SDS Number : 368550

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.

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

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

Full text of H-Statements referred to under sections 2 and 3.
H302     Harmful if swallowed.
H360     May damage fertility or the unborn child.
Annex

1. Short title of Exposure Scenario: Distribution

Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use : SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals

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)

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

Environmental release category : ERC1: Manufacture of substances

Further information : Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.

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

Product characteristics

Viscosity, dynamic : 10,34 mPa.s at 30 °C

(Msafe) : 111,000 kg/day

Environment factors not influenced by risk management

Flow rate : 18,000 m3/d

Dilution Factor (River) : 10

Dilution Factor (Coastal Areas) : 100

Other given operational conditions affecting environmental exposure

Number of emission days per year : 300

Emission or Release Factor: Air : 0,001 %

Emission or Release Factor: Water : 0,001 %

Emission or Release Factor: Soil : 0,001 %

Technical conditions and measures / Organizational measures

Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 90 %)

Remarks : Prevent environmental discharge consistent with regulatory
### 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>Percentage removed from waste water</td>
<td>0 %</td>
</tr>
<tr>
<td>Procedures to limit air emissions from Sewage Treatment Plant</td>
<td>No data available</td>
</tr>
<tr>
<td>Remarks</td>
<td>Domestic sewage treatment is not assumed.</td>
</tr>
</tbody>
</table>

### Conditions and measures related to external treatment of waste for disposal

| Waste treatment | External treatment and disposal of waste should comply with applicable local and/or national regulations. |

### Conditions and measures related to external recovery of waste

| Recovery Methods | External recovery and recycling of waste should comply with applicable local and/or national regulations. |

### 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation)

#### Product characteristics

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure</td>
<td>&gt; 0,5 kPa</td>
</tr>
</tbody>
</table>

#### Amount used

| Remarks | Not applicable |

#### Frequency and duration of use

| Remarks | Covers daily exposures up to 8 hours (unless stated differently) |

#### Other operational conditions affecting workers exposure

| Remarks | Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently. |

#### Technical conditions and measures

Ensure operation is undertaken outdoors.

### 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

<table>
<thead>
<tr>
<th>Physical Form (at time of use)</th>
<th>Liquid substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor pressure</td>
<td>&gt; 0,5 kPa</td>
</tr>
</tbody>
</table>

#### Amount used

| Remarks | Not applicable |

#### Frequency and duration of use

| Remarks | Covers daily exposures up to 8 hours (unless stated differently) |
Other operational conditions affecting workers exposure
Remarks
Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.

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

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

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
Vapor pressure : > 0,5 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks
Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.

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

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
Vapor pressure : > 0,5 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

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Remarks: Assumes a good basic standard of occupational hygiene is implemented, Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.

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

Product characteristics
Physical Form (at time of use): Liquid substance
Vapor pressure: > 0.5 kPa

Amount used
Remarks: Not applicable

Frequency and duration of use
Remarks: Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks: Assumes a good basic standard of occupational hygiene is implemented, Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure operation is undertaken outdoors.

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

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>Compartments</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>Freshwater</td>
<td>0.00103 mg/L</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.000103 mg/L</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.000884 mg/kg</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.0000878 mg/kg</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>0.000216 mg/kg</td>
<td>0.01</td>
<td></td>
<td></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, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000013627
<table>
<thead>
<tr>
<th>Procedure</th>
<th>ECETOC TRA</th>
<th>Worker – inhalation, long-term – systemic Combined routes</th>
<th>0,10</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC2, CS15, CS67</td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,77</td>
</tr>
<tr>
<td>PROC3, CS2</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic Combined routes</td>
<td>1,47 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,90</td>
</tr>
<tr>
<td>PROC8a, CS39</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic Combined routes</td>
<td>0,13 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>2,74 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,85</td>
</tr>
<tr>
<td>PROC8b, CS14, CS39</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic Combined routes</td>
<td>1,05 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,37 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,97</td>
</tr>
<tr>
<td>, CS6</td>
<td></td>
<td>Worker – inhalation, long-term – systemic Combined routes</td>
<td>1,05 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,37 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,97</td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic Combined routes</td>
<td>0,30 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,26</td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure
CS15: General exposures (closed systems)
CS67: Storage

PROC3: Use in closed batch process (synthesis or formulation)
CS2: Process sampling

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
CS39: Equipment cleaning and maintenance

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
CS14: Bulk transfers
CS39: Equipment cleaning and maintenance

PROC15: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
CS6: Drum and small package filling
## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Confirm that RMMs and OCs are as described or of equivalent efficiency. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

1. Short title of Exposure Scenario: **Use as an aromatics extraction solvent - industrial**

| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Sector of use | SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals |
| Process category | PROC1: Use in closed process, no likelihood of exposure; PROC2: Use in closed, continuous process with occasional controlled exposure; 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 |
| Environmental release category | ERC1, ERC4, ERC6a: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates) |
| Further information | Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities |

### 2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC4, ERC6a: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates)

#### Product characteristics
- **Viscosity, dynamic**: 10,34 mPa.s at 30 °C
- **(Msafe)**: 200 kg/day

#### Environment factors not influenced by risk management
- **Flow rate**: 18,000 m3/d
- **Dilution Factor (River)**: 10
- **Dilution Factor (Coastal Areas)**: 100
## Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Number of emission days per year</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission or Release Factor: Air</td>
<td>0.001 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
<td>1 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
<td>0.01 %</td>
</tr>
</tbody>
</table>

### Technical conditions and measures / Organizational measures

**Air**: Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 90 %)

**Remarks**: Prevent environmental discharge consistent with regulatory requirements.

**Water**: No onsite wastewater treatment prior to discharge to sewage treatment plant.

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

**Type of Sewage Treatment Plant**: Municipal sewage treatment plant

**Percentage removed from waste water**: 0 %

**Procedures to limit air emissions from Sewage Treatment Plant**

**Remarks**: Domestic sewage treatment is not assumed.

### Conditions and measures related to external treatment of waste for disposal

**Waste treatment**: External treatment and disposal of waste should comply with applicable local and/or national regulations.

### Conditions and measures related to external recovery of waste

**Recovery Methods**: External recovery and recycling of waste should comply with applicable local and/or national regulations.

### 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC15:

Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use as laboratory reagent

**Product characteristics**

**Physical Form (at time of use)**: Liquid substance

**Vapor pressure**: > 0.5 kPa

### Amount used

**Remarks**: Not applicable

### Frequency and duration of use

**Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

### Other operational conditions affecting workers exposure

**Remarks**: Assumes a good basic standard of occupational hygiene is implemented.. Assumes use at not more than 20°C above ambient temperature, unless stated differently.

### 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

**Vapor pressure**: > 0.5 kPa
Sulfolane, Electronic Grade

**Amount used**
Remarks : Not applicable

**Frequency and duration of use**
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

**Other operational conditions affecting workers exposure**
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
Provide enhanced general ventilation by mechanical means.

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.

### 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
Vapor pressure : > 0,5 kPa

**Amount used**
Remarks : Not applicable

**Frequency and duration of use**
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

**Other operational conditions affecting workers exposure**
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
Provide enhanced general ventilation by mechanical means.

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

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

**Environment**

<table>
<thead>
<tr>
<th>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>ERC1, ERC4, ERC6a</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0,0893 mg/L</td>
<td>0,9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0,00894 mg/L</td>
<td>0,9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater</td>
<td>0,0764 mg/kg</td>
<td>0,9</td>
<td></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, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>PROC2, CS15, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.70 ppm</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.30 ppm</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS39</td>
<td>ECETOC TRA</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.21 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>2.74 mg/kg/d</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS14, CS39</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1.05 ppm</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.4</td>
<td></td>
</tr>
</tbody>
</table>

**PROC1:** Use in closed process, no likelihood of exposure  
**CS15:** General exposures (closed systems)

**PROC2:** Use in closed, continuous process with occasional controlled exposure  
**CS15:** General exposures (closed systems)  
**CS67:** Storage

**PROC15:** Use as laboratory reagent  
**CS36:** Laboratory activities

**PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities  
**CS39:** Equipment cleaning and maintenance

**PROC8b:** Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities  
**CS14:** Bulk transfers

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CS39: Equipment cleaning and maintenance

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

Confirm that RMMs and OCs are as described or of equivalent efficiency. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1. Confirm that RMMs and OCs are as described or of equivalent efficiency. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

1. Short title of Exposure Scenario: Use in acid gas purification – industrial

Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use : SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process category : PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
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

Environmental release category : ERC1, ERC4, ERC6a: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates)

Further information : Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities

2.1 Contributing scenario controlling environmental exposure for:ERC1, ERC4, ERC6a: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics
Viscosity, dynamic : 10,34 mPa.s at 30 °C

(Msafe) : 200 kg/day

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

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**Sulfolane, Electronic Grade**

**Version 3.4**

**Revision Date 2017-06-26**

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### Dilution Factor (River)

<table>
<thead>
<tr>
<th>Dilution Factor (River)</th>
<th>10</th>
</tr>
</thead>
</table>

### Dilution Factor (Coastal Areas)

<table>
<thead>
<tr>
<th>Dilution Factor (Coastal Areas)</th>
<th>100</th>
</tr>
</thead>
</table>

---

**Other given operational conditions affecting environmental exposure**

- **Number of emission days per year**: 300
- **Emission or Release Factor: Air**: 0.001 %
- **Emission or Release Factor: Water**: 1 %
- **Emission or Release Factor: Soil**: 0.01 %

---

**Technical conditions and measures / Organizational measures**

- **Air**: Treat air emission to provide a typical removal efficiency of (%) (Effectiveness: > 90 %)

- **Remarks**: Prevent environmental discharge consistent with regulatory requirements.

- **Water**: No onsite wastewater treatment prior to discharge to sewage treatment plant.

---

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

- **Type of Sewage Treatment Plant**: Municipal sewage treatment plant

- **Percentage removed from waste water**: 0 %

- **Procedures to limit air emissions from Sewage Treatment Plant**: No data available

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**Conditions and measures related to external treatment of waste for disposal**

- **Waste treatment**: External treatment and disposal of waste should comply with applicable local and/or national regulations.

---

**Conditions and measures related to external recovery of waste**

- **Recovery Methods**: External recovery and recycling of waste should comply with applicable local and/or national regulations.

---

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC15:**

Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use as laboratory reagent

---

**Product characteristics**

- **Physical Form (at time of use)**: Liquid substance

- **Vapor pressure**: > 0.5 kPa

---

**Amount used**

- **Remarks**: Not applicable

---

**Frequency and duration of use**

- **Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

---

**Other operational conditions affecting workers exposure**

- **Remarks**: Assumes a good basic standard of occupational hygiene is implemented. Assumed use at not more than 20°C above ambient temperature, unless stated differently.

---

**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

---

**SDS Number:** 100000013627
## Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Vapor pressure:** > 0.5 kPa

## Amount used
- **Remarks:** Not applicable

## Frequency and duration of use
- **Remarks:** Covers daily exposures up to 8 hours (unless stated differently)

## Other operational conditions affecting workers exposure
- **Remarks:** Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

## Technical conditions and measures
- Provide enhanced general ventilation by mechanical means.

## Conditions and measures related to personal protection, hygiene and health evaluation
- Wear suitable respiratory protection (conforming to EN140 with Type A filter or better) and gloves (type EN374) if regular skin contact likely.

### 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
- **Vapor pressure:** > 0.5 kPa

## Amount used
- **Remarks:** Not applicable

## Frequency and duration of use
- **Remarks:** Covers daily exposures up to 8 hours (unless stated differently)

## Other operational conditions affecting workers exposure
- **Remarks:** Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

## Technical conditions and measures
- Provide enhanced general ventilation by mechanical means.

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

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

#### Environment

<table>
<thead>
<tr>
<th>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>ERC1, ERC4, EUSES</td>
<td></td>
<td></td>
<td>Freshwater</td>
<td>0.0893 mg/L</td>
<td></td>
<td>0.9</td>
</tr>
</tbody>
</table>

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## Sulfolane, Electronic Grade

**SAFETY DATA SHEET**

### Version 3.4

**Revision Date 2017-06-26**

<table>
<thead>
<tr>
<th>ERC6a</th>
<th><strong>Exposure Assessment Method</strong></th>
<th><strong>Specific conditions</strong></th>
<th><strong>Value type</strong></th>
<th><strong>Level of Exposure</strong></th>
<th><strong>Risk characterization ratio</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>marine water</td>
<td>0.00894 mg/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>freshwater sediment</td>
<td>0.0764 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>marine sediment</td>
<td>0.00764 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>soil</td>
<td>0.00149 mg/kg</td>
</tr>
</tbody>
</table>

**ERC1:** Manufacture of substances  
**ERC4:** Industrial use of processing aids in processes and products, not becoming part of articles  
**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)

### Workers/Consumers

<table>
<thead>
<tr>
<th><strong>Contributing Scenario</strong></th>
<th><strong>Exposure Assessment Method</strong></th>
<th><strong>Specific conditions</strong></th>
<th><strong>Value type</strong></th>
<th><strong>Level of Exposure</strong></th>
<th><strong>Risk characterization ratio</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1, CS15, CS15, CS67</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>PROC1, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.70 ppm</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.30 ppm</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS39</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.21 ppm</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>2.74 mg/kg/d</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS14, CS39</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1.05 ppm</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.97</td>
<td></td>
</tr>
</tbody>
</table>

**PROC1:** Use in closed process, no likelihood of exposure  
**CS15:** General exposures (closed systems)  
**PROC2:** Use in closed, continuous process with occasional controlled exposure  
**CS15:** General exposures (closed systems)  
**CS67:** Storage  
**PROC15:** Use as laboratory reagent  
**CS36:** Laboratory activities  
**PROC8a:** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities  
**CS39:** Equipment cleaning and maintenance

**SDS Number:** 100000013627
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Confirm that RMMs and OCs are as described or of equivalent efficiency. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

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

Main User Groups: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Sector of use: SU 10: Formulation [mixing] of preparations and/or re-packing (excluding alloys)

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
- PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
- PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
- PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
- PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelletization; Industrial setting;
- PROC15: Use as laboratory reagent

Environmental release category: ERC2: Formulation of preparations

Further information:
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

Product characteristics:

- Viscosity, dynamic: 10.34 mPa.s at 30 °C
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (tonnes/day): (MSafe)
Remarks : Not applicable

Technical conditions and measures / Organizational measures
Remarks : Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC15:
Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use as laboratory reagent

Product characteristics
Physical Form (at time of use) : Liquid substance
Vapor pressure : > 0.5 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

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
Vapor pressure : > 0.5 kPa

Amount used
Remarks : Not applicable

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Provide enhanced general ventilation by mechanical means.
2.2 Contributing scenario controlling worker exposure for: PROC4, PROC8b, PROC9, PROC14: Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Production of mixtures or articles by tablettting, compression, extrusion, pelletization; Industrial setting;

Product characteristics
- Physical Form (at time of use) : Liquid substance
- Vapor pressure : > 0,5 kPa

Amount used
- Remarks : Not applicable

Frequency and duration of use
- Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
- Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
- Provide enhanced general ventilation by mechanical means.

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

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

2.2 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) Industrial setting;

Product characteristics
- Physical Form (at time of use) : Liquid substance
- Vapor pressure : > 0,5 kPa

Amount used
- Remarks : Not applicable

Frequency and duration of use
- Remarks : Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
- Remarks : Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Conditions and measures related to personal protection, hygiene and health evaluation
- Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
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
- Vapor pressure: > 0,5 kPa

Amount used
- Remarks: Not applicable

Frequency and duration of use
- Remarks: Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure
- Remarks: Assumes a good basic standard of occupational hygiene is implemented.; Assumes use at not more than 20°C above ambient temperature, unless stated differently.

Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

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

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Workers/Consumers</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, CS15, ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,01 ppm</td>
<td>0,0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
<td>0,1</td>
<td></td>
</tr>
<tr>
<td>PROC2, CS15, ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,00 ppm</td>
<td>0,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,34 mg/kg/d</td>
<td>0,4</td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36, ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,5 ppm</td>
<td>0,8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
<td>0,1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0,92</td>
<td></td>
</tr>
<tr>
<td>PROC3, CS15, ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,90 ppm</td>
<td>0,5</td>
<td></td>
</tr>
</tbody>
</table>
## SAFETY DATA SHEET

**Sulfolane, Electronic Grade**

**Version 3.4**  
**Revision Date 2017-06-26**

### Worker – dermal, long-term – systemic

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,34 mg/kg/d      | 0,1            |                            |

### Worker – long-term – systemic Combined routes

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,59              |                |                            |

### PROC4, CS55 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,90 ppm          | 0,5            |                            |
| 1,37 mg/kg/d      | 0,4            |                            |

### PROC8b, CS14 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,90 ppm          | 0,5            |                            |
| 1,37 mg/kg/d      | 0,4            |                            |

### PROC9, CS4 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,90 ppm          | 0,5            |                            |
| 1,37 mg/kg/d      | 0,4            |                            |

### PROC14, CS4 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,90 ppm          | 0,5            |                            |
| 0,69 mg/kg/d      | 0,2            |                            |

### PROC5, CS30 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,90 ppm          | 0,5            |                            |
| 1,37 mg/kg/d      | 0,4            |                            |

### PROC8a, CS14 ECETOC TRA Modified

| Route of Exposure | Exposure Limit | Exceeding Limit<br>mg/kg/d | Exceeding Limit<br>ppm |
|-------------------|----------------|----------------------------|
| 0,84 ppm          | 0,5            |                            |
| 1,37 mg/kg/d      | 0,4            |                            |

**PROC1:** Use in closed process, no likelihood of exposure  
**CS15:** General exposures (closed systems)

**PROC2:** Use in closed, continuous process with occasional controlled exposure  
**CS15:** General exposures (closed systems)

**PROC15:** Use as laboratory reagent  
**CS36:** Laboratory activities

**PROC3:** Use in closed batch process (synthesis or formulation)  
**CS15:** General exposures (closed systems)

**PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises  
**CS55:** Batch process

**PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities  
**CS14:** Bulk transfers

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

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**Page:** 31/37
## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Confirm that RMMs and OCs are as described or of equivalent efficiency. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

### 1. Short title of Exposure Scenario: **Use as a cleaning agent – 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>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</td>
</tr>
<tr>
<td>Process category</td>
<td>PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC7: Industrial spraying 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 PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</td>
</tr>
<tr>
<td>Further information</td>
<td>Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.</td>
</tr>
</tbody>
</table>
Sulfolane, Electronic Grade

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processing aids in processes and products, not becoming part of articles

Product characteristics

Viscosity, dynamic: 10,34 mPa.s at 30 °C
(Msafe): 396 kg/day

Environment factors not influenced by risk management

Flow rate: 18,000 m3/d
Dilution Factor (River): 10
Dilution Factor (Coastal Areas): 100

Other given operational conditions affecting environmental exposure

Number of emission days per year: 300
Emission or Release Factor: Air: 30 %
Emission or Release Factor: Water: 0,01 %
Emission or Release Factor: Soil: 0 %

Technical conditions and measures / Organizational measures

Air: Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: > 70 %)
Remarks: Prevent environmental discharge consistent with regulatory requirements.
Water: No onsite wastewater treatment prior to discharge to sewage treatment plant.

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant: Municipal sewage treatment plant
Percentage removed from wastewater: 0 %
Procedures to limit air emissions from Sewage Treatment Plant: No data available
Remarks: Domestic sewage treatment is not assumed.

Conditions and measures related to external treatment of waste for disposal

Waste treatment: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Recovery Methods: External recovery and recycling of waste should comply with applicable local and/or national regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure

Product characteristics

Physical Form (at time of use): Liquid substance
Vapor pressure: > 0,5 kPa

Amount used

Remarks: Not applicable

Frequency and duration of use

Remarks: Covers daily exposures up to 8 hours (unless stated differently)

Other operational conditions affecting workers exposure

Remarks: Assumes a good basic standard of occupational hygiene is
Technical conditions and measures
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

### 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
- **Vapor pressure**: > 0,5 kPa

**Amount used**
- **Remarks**: Not applicable

**Frequency and duration of use**
- **Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

**Other operational conditions affecting workers exposure**
- **Remarks**: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
Provide enhanced general ventilation by mechanical means.

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

**Conditions and measures related to personal protection, hygiene and health evaluation**
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.

### 2.2 Contributing scenario controlling worker exposure for: PROC7: Industrial spraying

**Product characteristics**
- **Physical Form (at time of use)**: Liquid substance
- **Vapor pressure**: > 0,5 kPa

**Amount used**
- **Remarks**: Not applicable

**Frequency and duration of use**
- **Remarks**: Covers daily exposures up to 8 hours (unless stated differently)

**Other operational conditions affecting workers exposure**
- **Remarks**: Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

**Technical conditions and measures**
Ensure material transfers are under containment or extract ventilation.
### Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear a full face respirator conforming to EN140 with Type A filter or better.

### 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
- **Vapor pressure:** > 0.5 kPa

#### Amount used
- **Remarks:** Not applicable

#### Frequency and duration of use
- **Remarks:** Covers daily exposures up to 8 hours (unless stated differently)

#### Other operational conditions affecting workers exposure
- **Remarks:** Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Technical conditions and measures
- Provide enhanced general ventilation by mechanical means.

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

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

### 2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC10, PROC13: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Roller application or brushing, Treatment of articles by dipping and pouring

#### Product characteristics
- **Physical Form (at time of use):** Liquid substance
- **Vapor pressure:** > 0.5 kPa

#### Amount used
- **Remarks:** Not applicable

#### Frequency and duration of use
- **Remarks:** Covers daily exposures up to 8 hours (unless stated differently)

#### Other operational conditions affecting workers exposure
- **Remarks:** Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.

#### Technical conditions and measures
Ensure material transfers are under containment or extract ventilation.

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

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

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>ERC4</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.00137 mg/L</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.000136 mg/L</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.00117 mg/kg</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.000116 mg/kg</td>
<td>0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>0.00794</td>
<td>0.45</td>
<td></td>
</tr>
</tbody>
</table>

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

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, CS15</td>
<td>ECETOC TRA Modified</td>
<td></td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.01 ppm</td>
<td>0.0</td>
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<tr>
<td></td>
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<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.34 mg/kg/d</td>
<td>0.1</td>
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<td>Worker – long-term – systemic Combined routes</td>
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<tr>
<td>PROC2, CS15</td>
<td>ECETOC TRA Modified</td>
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<td>Worker – inhalation, long-term – systemic</td>
<td>1.00 ppm</td>
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<tr>
<td></td>
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<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
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<tr>
<td></td>
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<td>Worker – long-term – systemic Combined routes</td>
<td>0.94</td>
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<tr>
<td>PROC4, CS55</td>
<td>ECETOC TRA Modified</td>
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<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
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<tr>
<td></td>
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<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.69 mg/kg/d</td>
<td>0.2</td>
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<tr>
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<td>Worker – long-term – systemic Combined routes</td>
<td>0.69</td>
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</tr>
<tr>
<td>PROC7, CS10</td>
<td>ECETOC TRA Modified</td>
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<td>Worker – inhalation, long-term – systemic</td>
<td>0.60 ppm</td>
<td>0.3</td>
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<td>Worker – dermal, long-term – systemic</td>
<td>2.14 mg/kg/d</td>
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<td>Worker – long-term – systemic Combined routes</td>
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<tr>
<td>PROC8b, CS14</td>
<td>ECETOC TRA Modified</td>
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<td>Worker – inhalation, long-term – systemic</td>
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<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
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<td>Worker – long-term – systemic Combined</td>
<td>0.88</td>
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</tbody>
</table>
### SAFETY DATA SHEET

**Sulfolane, Electronic Grade**

**Version 3.4**  
**Revision Date 2017-06-26**  

**SDS Number:** 100000013627

<table>
<thead>
<tr>
<th>PROC</th>
<th>CS</th>
<th>ECETOC TRA</th>
<th>Routes</th>
<th>Predicted DNELs</th>
<th>Risk Characterisation Ratios</th>
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</thead>
<tbody>
<tr>
<td>PROC8a, CS14</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1.20 ppm</td>
<td>0.7</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.69 mg/kg/d</td>
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<td>Worker – long-term – systemic Combined routes</td>
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<td>0.85</td>
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<tr>
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<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>1.37 mg/kg/d</td>
<td>0.4</td>
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<td>Worker – long-term – systemic Combined routes</td>
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<td>0.72</td>
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<td>0.69 mg/kg/d</td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.85</td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure  
CS15: General exposures (closed systems)

PROC2: Use in closed, continuous process with occasional controlled exposure  
CS15: General exposures (closed systems)

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises  
CS55: Batch process

PROC7: Industrial spraying  
CS10: Spraying

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities  
CS14: Bulk transfers

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities  
CS14: Bulk transfers

PROC10: Roller application or brushing  
CS51: Rolling, Brushing

PROC13: Treatment of articles by dipping and pouring  
CS4: Dipping, immersion and pouring

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

Confirm that RMMs and OCs are as described or of equivalent efficiency.  
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1