SAFETY DATA SHEET

Sulfolane-A, Low Color
Version 2.3
Revision Date 2016-06-22

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

Product information

Product Name: Sulfolane-A, Low Color
Material: 1096434, 1069981, 1024655, 1024657, 1024658, 1024654, 1024659, 1024656

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

Supported: Distribution
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 Vincielaan 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:

SDS Number: 100000013350

1/37
# SAFETY DATA SHEET

## Sulfolane-A, Low Color

**Version 2.3**

| 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 |
| Website | www.CPChem.com |

## SECTION 2: Hazards identification

### Classifications 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)**

- **Signal Word**: Danger

- **Hazard pictograms**

  ![Hazard pictogram]

- **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:

- The following percentage of the mixture consists of ingredient(s) with unknown acute toxicity: 1 %
- The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 1 %
Sulfolane-A, Low Color

SECTION 3: Composition/information on ingredients

Synonyms: Sulfolane Anhydrous
Tetramethylene Sulfone
Sulfone

Molecular formula: C₄H₈SO₂

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>Sulfolane</td>
<td>126-33-0 204-783-1 016-031-00-8</td>
<td>Acute Tox. 4; H302 Repr. 1B; H360</td>
<td>99 - 100</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.

Special protective: Wear self-contained breathing apparatus for firefighting if

SDS Number:100000013350 3/37
equipment for fire-fighters necessary.

Further information: Standard procedure for chemical fires. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Fire and explosion protection: Normal measures for preventive fire protection.

Hazardous decomposition products: Carbon oxides. Sulfur oxides.

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

Handling

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 TWA</td>
<td>0,37 ppm.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LT

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

DNEL: Routes of exposure: Skin contact
Potential health effects: Chronic effects, Systemic effects
Value: 7,8 mg/kg

SDS Number: 100000013350
SAFETY DATA SHEET

Sulfolane-A, Low Color

Version 2.3  Revision Date 2016-06-22

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 : Marine water
Value: 0.01 mg/l

PNEC : Fresh water sediment
Value: 0.39 mg/kg

PNEC : Marine sediment
Value: 0.039 mg/kg

PNEC : Soil
Value: 0.02 mg/kg

Engineering measures

Adequate ventilation to control airborned 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 work place 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 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: Lightweight protective clothing.
**Sulfolane-A, Low Color**

**Version 2.3**

**Revision Date 2016-06-22**

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**

**Appearance**
- **Form**: Liquid
- **Physical state**: Liquid
- **Color**: Clear
- **Odor**: Mild

**Safety data**
- **Flash point**: 166 °C (331 °F)
  - Method: Cleveland Open Cup
- **Lower explosion limit**: No data available
- **Upper explosion limit**: No data available
- **Oxidizing properties**: no
- **Autoignition temperature**: No data available
- **Molecular formula**: C4H8SO2
- **Molecular weight**: 120,18 g/mol
- **pH**: Not applicable
- **Freezing point**: 26 °C (79 °F)
- **Pour point**: No data available
- **Boiling point/boiling range**: 282 - 288 °C (540 - 550 °F)
- **Vapor pressure**: 1,14 MMHG
  - at 37,8 °C (100,0 °F)
- **Relative density**: 1,26
  - at 30 °C (86 °F)
- **Density**: 1,26 G/ML
- **Water solubility**: Partly soluble
- **Partition coefficient: n-octanol/water**: No data available
- **Viscosity, kinematic**: No data available
- **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 : No data available.
Materials to avoid : May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous decomposition products : Carbon oxides, Sulfur oxides

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

SECTION 11: Toxicological information

Acute oral toxicity
Sulfolane : LD50: 2.068 mg/kg
Species: Rat
Sex: male and female
Method: OECD Test Guideline 401

Acute inhalation toxicity
Sulfolane : LC50: > 12 mg/l
Exposure time: 4 h
Species: Rat
An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

LC50: > 12000 mg/m3
Exposure time: 4 h
Species: Rat
Sex: male and female
Test atmosphere: vapor

Acute dermal toxicity
Sulfolane : LD50: >2000 mgKg
Species: Rat

Skin irritation
Sulfolane-A, Low Color

Sulfolane : No skin irritation

**Eye irritation**

Sulfolane : No eye irritation

**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
### Section 1: Species and Application Route

**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-A, Low Color

#### 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

### 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)  
  - **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)  
  - **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 : This material is not expected to be harmful to aquatic organisms.

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.

SDS Number:100000013350 10/37
Sulfolane-A, Low Color

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.  204-783-1

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

Water contaminating class (Germany) : WGK 2 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
Safefly Data Sheet

Sulfolane-A, Low Color

Version 2.3

Revision Date 2016-06-22

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

Further information
Legacy SDS Number : 646050

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>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
</tr>
<tr>
<td>AICS</td>
</tr>
<tr>
<td>DSL</td>
</tr>
<tr>
<td>NDSL</td>
</tr>
<tr>
<td>CNS</td>
</tr>
<tr>
<td>CAS</td>
</tr>
<tr>
<td>EC50</td>
</tr>
<tr>
<td>EC50</td>
</tr>
<tr>
<td>EGEST</td>
</tr>
<tr>
<td>EOSCA</td>
</tr>
<tr>
<td>EINECS</td>
</tr>
<tr>
<td>MAK</td>
</tr>
<tr>
<td>GHS</td>
</tr>
<tr>
<td>&gt;=</td>
</tr>
</tbody>
</table>
### SAFETY DATA SHEET

#### Sulfolane-A, Low Color

**Version 2.3**  
**Revision Date 2016-06-22**

<table>
<thead>
<tr>
<th>IC50</th>
<th>Inhibition Concentration 50%</th>
<th>SARA</th>
<th>Superfund Amendments and Reauthorization Act.</th>
</tr>
</thead>
<tbody>
<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.**

- **H302**  Harmful if swallowed.
- **H360**  May damage fertility or the unborn child.
### 1. Short title of Exposure Scenario: **Distribution**

<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>SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals</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>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>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental release category</th>
<th>ERC1: Manufacture of substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further information</td>
<td>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.</td>
</tr>
</tbody>
</table>

#### 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>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Sewage Treatment Plant</td>
<td>Municipal sewage treatment plant</td>
</tr>
<tr>
<td>Percentage removed from waste water</td>
<td>0 %</td>
</tr>
<tr>
<td>Procedures to limit 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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste treatment</td>
<td>External treatment and disposal of waste should comply with applicable local and/or national regulations.</td>
</tr>
</tbody>
</table>

## Conditions and measures related to external recovery of waste

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery Methods</td>
<td>External recovery and recycling of waste should comply with applicable local and/or national regulations.</td>
</tr>
</tbody>
</table>

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

### Amount used

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

### Other operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</td>
</tr>
</tbody>
</table>

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

### Amount used

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Sulfolane-A, Low Color

Version 2.3

Revision Date 2016-06-22

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

SDS Number: 100000013350

16/37
**SAFETY DATA SHEET**

**Sulfolane-A, Low Color**

Version 2.3  
Revision Date 2016-06-22

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>Compartment</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>Freshwater</td>
<td>0.00103 mg/L</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>marine water</td>
<td>Marine water</td>
<td>0.000103 mg/L</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>freshwater sediment</td>
<td>Freshwater sediment</td>
<td>0.000884 mg/kg</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>marine sediment</td>
<td>Marine sediment</td>
<td>0.0000878 mg/kg</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>soil</td>
<td>Soil</td>
<td>0.000216 mg/kg</td>
<td>0.01</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: 100000013350  
17/37
<table>
<thead>
<tr>
<th>PROC</th>
<th>CS</th>
<th>ECETOC TRA</th>
<th>Modified</th>
<th>Worker – inhalation, long-term – systemic Combined routes</th>
<th>0,70 ppm</th>
<th>0,4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC2, CS15, CS67</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,37 mg/kg/d</td>
<td>0,4</td>
<td></td>
</tr>
<tr>
<td>PROC3, CS2</td>
<td>ECETOC TRA</td>
<td>Modified</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>Modified</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</td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,37 mg/kg/d</td>
<td>0,4</td>
<td></td>
</tr>
<tr>
<td>PROC1, CS6</td>
<td>ECETOC TRA</td>
<td>Worker – dermal, long-term – systemic</td>
<td>1,05 ppm</td>
<td>0,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,34 mg/kg/d</td>
<td>0,1</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
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
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
- **SU8, SU9**: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals

#### 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
**SAFETY DATA SHEET**

**Sulfolane-A, Low Color**

**Version 2.3**

**Revision Date 2016-06-22**

### Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emission days per year</td>
<td>300</td>
</tr>
<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**: 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, 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

---

**SDS Number:100000013350**

20/37
Sulfolane-A, Low Color

Version 2.3

Revision Date 2016-06-22

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>

SDS Number:100000013350 21/37
**Sulfolane-A, Low Color**

**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></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
<td>0.10</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></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</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

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

**CS14:** Bulk transfers

**SDS Number:** 100000013350
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**

<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>SU8, SU9: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals</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>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>PROC15: Use as laboratory reagent</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>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)</td>
</tr>
<tr>
<td>Further information</td>
<td>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</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Product characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, dynamic</td>
<td>10.34 mPa.s at 30 °C</td>
</tr>
<tr>
<td>(Msafe)</td>
<td>200 kg/day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment factors not influenced by risk management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td>18.000 m3/d</td>
</tr>
</tbody>
</table>

SDS Number: 100000013350
## Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emission days per year</td>
<td>300</td>
</tr>
<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

<table>
<thead>
<tr>
<th>Medium</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Treat air emission to provide a typical removal efficiency of (%)</td>
</tr>
<tr>
<td>Remarks</td>
<td>Prevent environmental discharge consistent with regulatory requirements.</td>
</tr>
<tr>
<td>Water</td>
<td>No onsite wastewater treatment prior to discharge to sewage treatment plant.</td>
</tr>
</tbody>
</table>

## Conditions and measures related to municipal sewage treatment plant

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Sewage Treatment Plant</td>
<td>Municipal sewage treatment plant</td>
</tr>
<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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste treatment</td>
<td>External treatment and disposal of waste should comply with applicable local and/or national regulations.</td>
</tr>
</tbody>
</table>

## Conditions and measures related to external recovery of waste

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery Methods</td>
<td>External recovery and recycling of waste should comply with applicable local and/or national regulations.</td>
</tr>
</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form (at time of use)</td>
<td>Liquid substance</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&gt; 0.5 kPa</td>
</tr>
</tbody>
</table>

### Amount used

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Frequency and duration of use

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Covers daily exposures up to 8 hours (unless stated differently)</td>
</tr>
</tbody>
</table>

### Other operational conditions affecting workers exposure

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remarks</td>
<td>Assumes a good basic standard of occupational hygiene is implemented., Assumes use at not more than 20°C above ambient temperature, unless stated differently.</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

SDS Number:100000013350 24/37
Sulfolane-A, Low Color

Version 2.3
Revision Date 2016-06-22

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>Compart ment</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>0.9</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number:100000013350 25/37
## SAFETY DATA SHEET

**Sulfolane-A, Low Color**

Version 2.3

Revision Date 2016-06-22

<table>
<thead>
<tr>
<th>ERC6a</th>
<th>Marine water</th>
<th>0.00894 mg/L</th>
<th>0.9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freshwater sediment</td>
<td>0.0764 mg/kg</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Marine sediment</td>
<td>0.00764 mg/kg</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Soil</td>
<td>0.00149 mg/kg</td>
<td>0.083</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>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></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.10</td>
<td></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></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.77</td>
<td></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>0.26</td>
<td></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>0.90</td>
<td></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>0.97</td>
<td></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:100000013350

26/37
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: **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
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14: Production of mixtures or articles by tabletting, compression, extrusion, pelleting; 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, pelleting, 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
### 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 tabletting, 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: 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

#### 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></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC2, CS15</td>
<td>ECETOC TRA 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></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC15, CS36</td>
<td>ECETOC TRA 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>0.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3, CS15</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
<td>0.5</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>0.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC4, CS55</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
<td>0.5</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>0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS14</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
<td>0.5</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>0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC9, CS4</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
<td>0.5</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>0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC14, CS4</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0.90 ppm</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0.69 mg/kg/d</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 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>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>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</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</td>
</tr>
</tbody>
</table>

SDS Number: 100000013350

31/37
Sulfolane-A, Low Color

**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

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

Further information : 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.

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

#### Product characteristics

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity, dynamic</td>
<td>10.34 mPa.s at 30 °C</td>
</tr>
<tr>
<td><em>(Msafe)</em></td>
<td>396 kg/day</td>
</tr>
</tbody>
</table>

#### Environment factors not influenced by risk management

<table>
<thead>
<tr>
<th>Factor</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td>18.000 m3/d</td>
</tr>
<tr>
<td>Dilution Factor (River)</td>
<td>10</td>
</tr>
<tr>
<td>Dilution Factor (Coastal Areas)</td>
<td>100</td>
</tr>
</tbody>
</table>

#### Other given operational conditions affecting environmental exposure

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emission days per year</td>
<td>300</td>
</tr>
<tr>
<td>Emission or Release Factor: Air</td>
<td>30 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
<td>0.01 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
<td>0 %</td>
</tr>
</tbody>
</table>

#### Technical conditions and measures / Organizational measures

<table>
<thead>
<tr>
<th>Environment</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Treat air emission to provide a typical removal efficiency of (%) : (Effectiveness: &gt; 70 %)</td>
</tr>
<tr>
<td>Remarks</td>
<td>Prevent environmental discharge consistent with regulatory requirements.</td>
</tr>
<tr>
<td>Water</td>
<td>No onsite wastewater treatment prior to discharge to sewage treatment plant.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Sewage Treatment Plant</td>
<td>Municipal sewage treatment plant</td>
</tr>
<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>
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: Assesses 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 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

<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 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>ERC4</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>0.00137 mg/L</td>
<td>0,014</td>
<td></td>
</tr>
<tr>
<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>Freshwater sediment</td>
<td>0,00117 mg/kg</td>
<td>0,014</td>
<td></td>
</tr>
<tr>
<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>Soil</td>
<td>0,00794 mg/kg</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>PROC1, CS15</th>
<th>ECETOC TRA Modified</th>
<th>Worker – inhalation, long-term – systemic</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>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>
</tbody>
</table>

SDS Number:100000013350 35/37
### Sulfolane-A, Low Color

**SAFETY DATA SHEET**

**Version 2.3**

**Revision Date 2016-06-22**

<table>
<thead>
<tr>
<th>PROC, CS</th>
<th>ECETOC TRA</th>
<th>Modified</th>
<th>Worker – long-term – systemic Combined routes</th>
<th>0,10</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC2, CS15</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,00 ppm</td>
</tr>
<tr>
<td></td>
<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></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC4, CS55</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,90 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,69 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC7, CS10</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,60 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>2,14 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC8b, CS14</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,90 ppm</td>
</tr>
<tr>
<td></td>
<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></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC8a, CS14</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,20 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,69 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC10, CS51</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,60 ppm</td>
</tr>
<tr>
<td></td>
<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></td>
<td>Worker – long-term – systemic Combined routes</td>
<td></td>
</tr>
<tr>
<td>PROC13, CS4</td>
<td>ECETOC TRA</td>
<td>Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>1,20 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,69 mg/kg/d</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</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
Sulfolane-A, Low Color

Version 2.3

Revision Date 2016-06-22

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.