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

1.1 Product information

Product Name: AlphaPlus® 1-Hexene
Material: 1117427, 1088135, 1081271, 1084562, 1070002, 1025308, 1017828, 1032321, 1017829, 1028630, 1026835, 1028342, 1011442, 1026834, 1015415

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index No.</th>
<th>Legal Entity Registration number</th>
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<tbody>
<tr>
<td>1-Hexene</td>
<td>592-41-6</td>
<td>209-753-1</td>
<td></td>
<td>Chevron Phillips Chemical Company LP 01-2119475505-34-0005</td>
</tr>
</tbody>
</table>

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

Relevant Identified Uses Supported: Manufacture Distribution Use as an intermediate Formulation Lubricants - Industrial Lubricants - Professional Lubricants - Consumer Metal working fluids / rolling oils - Industrial Metal working fluids / rolling oils – Professional Use as a fuel - industrial Use as a fuel – professional Functional Fluids - Industrial Functional Fluids - Professional Use in polymer production – industrial

1.3 Details of the supplier of the safety data sheet

Company: Chevron Phillips Chemical Company LP Normal Alpha Olefins (NAO) 10001 Six Pines Drive The Woodlands, TX 77380

Local: Chevron Phillips Chemicals International N.V.
# AlphaPlus® 1-Hexene

**Version 3.7**

<table>
<thead>
<tr>
<th>Airport Plaza (Stockholm Building)</th>
<th>1831 Diegem</th>
<th>Belgium</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Requests: (800) 852-5530</td>
<td>Technical Information: (832) 813-4862</td>
<td></td>
</tr>
<tr>
<td>Responsible Party: Product Safety Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email:<a href="mailto:sds@cpchem.com">sds@cpchem.com</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 1.4 Emergency telephone:

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

**Transport:**
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)  
Asia: CHEMWATCH (+61 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

### 2.1 Classification of the substance or mixture

**REGULATION (EC) No 1272/2008**

- **Flammable liquids, Category 2**  
  **H225:** Highly flammable liquid and vapor.
- **Aspiration hazard, Category 1**  
  **H304:** May be fatal if swallowed and enters airways.

### 2.2 Labeling (REGULATION (EC) No 1272/2008)

- **Hazard pictograms:** ![Flammable](image1.png) ![Aspiration Hazard](image2.png)
- **Signal Word:** Danger
- **Hazard Statements:**  
  - **H225** Highly flammable liquid and vapor.  
  - **H304** May be fatal if swallowed and enters airways.
- **Precautionary Statements**  
  - **Prevention:** P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
  - **P233** Keep container tightly closed.
Response:
P301 + P310  IF SWALLOWED: Immediately call a
POISON CENTER/doctor.
P303 + P361 + P353  IF ON SKIN (or hair): Take off
immediately all contaminated clothing.
Rinse skin with water.
P331  Do NOT induce vomiting.
P370 + P378  In case of fire: Use dry sand, dry chemical
or alcohol-resistant foam to extinguish.

Hazardous ingredients which must be listed on the label:
- 592-41-6  1-Hexene
- 760-21-4  2-Ethyl-1-Butene

SECTION 3: Composition/information on ingredients

3.1 - 3.2 Substance or Mixture
Synonyms:
- alpha-Hexene
- Hexene-1
- Hex-1-ene
- Hexylene
- NAO 6
- Butyl Ethylene
- C6H12

Molecular formula: C6H12

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>
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</thead>
<tbody>
<tr>
<td>1-Hexene</td>
<td>592-41-6 209-753-1</td>
<td>Flam. Liq. 2; H225 Asp. Tox. 1; H304</td>
<td>99 - 100</td>
</tr>
<tr>
<td>2-Ethyl-1-Butene</td>
<td>760-21-4 212-078-5</td>
<td>Flam. Liq. 2; H225 STOT SE 3; H336 Asp. Tox. 1; H304</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

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

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice:
Move out of dangerous area. Show this material safety data sheet to the doctor in attendance. Material may produce a serious, potentially fatal pneumonia if swallowed or vomited.

If inhaled:
If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.
In case of skin contact: If on skin, rinse well with water. If on clothes, remove clothes.

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: Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

### SECTION 5: Firefighting measures

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flash point</strong></td>
<td>-26 °C (-15 °F)</td>
</tr>
<tr>
<td><strong>Autoignition temperature</strong></td>
<td>272 °C (522 °F)</td>
</tr>
</tbody>
</table>

5.1 **Extinguishing media**

- Suitable extinguishing media: Alcohol-resistant foam. Carbon dioxide (CO2). Dry chemical.
- Unsuitable extinguishing media: High volume water jet.

5.2 **Special hazards arising from the substance or mixture**

- Specific hazards during fire fighting: Do not allow run-off from fire fighting to enter drains or water courses.

5.3 **Advice for firefighters**

- Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for firefighting if necessary.
- Further information: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. For safety reasons in case of fire, cans should be stored separately in closed containments. Use a water spray to cool fully closed containers.
- Fire and explosion protection: Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

### SECTION 6: Accidental release measures

6.1 **Personal precautions, protective equipment and emergency procedures**

- Personal precautions: Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate.
AlphaPlus® 1-Hexene

6.2 Environmental precautions

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

6.3 Methods and materials for containment and cleaning up

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

6.4 Reference to other sections

Reference to other sections : For personal protection see section 8. For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Take precautionary measures against static discharges. Provide sufficient air exchange and/or exhaust in work rooms. Container may be opened only under exhaust ventilation hood. Open drum carefully as content may be under pressure. Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Do not spray on an open flame or any other incandescent material. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use only explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition.

7.2 Conditions for safe storage, including any incompatibilities

Storage

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

8.1 Control parameters
Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>PT</th>
<th>Componentes</th>
<th>Bases</th>
<th>Valor</th>
<th>Parâmetros de controlo</th>
<th>Nota</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Hexene</td>
<td>PT OEL</td>
<td>VLE-MP</td>
<td>50 ppm</td>
<td>afeção do SNC</td>
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<table>
<thead>
<tr>
<th>ES</th>
<th>Componentes</th>
<th>Base</th>
<th>Valor</th>
<th>Parâmetros de control</th>
<th>Nota</th>
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</thead>
<tbody>
<tr>
<td>1-Hexene</td>
<td>ES VLA</td>
<td>VLA-ED</td>
<td>50 ppm</td>
<td>afeção do sistema nervoso central</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BE</th>
<th>Bestanddelen</th>
<th>Basis</th>
<th>Waarde</th>
<th>Controleparameters</th>
<th>Opmerking</th>
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<tbody>
<tr>
<td>1-Hexene</td>
<td>BE OEL</td>
<td>TGG 8 hr</td>
<td>50 ppm</td>
<td>175 mg/m3</td>
<td></td>
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</tbody>
</table>

PNEC
Fresh water
Value: 0,111 mg/l

PNEC
Sea water
Value: 0,111 mg/l

PNEC
Fresh water sediment
Value: 19,25 mg/kg

PNEC
Sea sediment
Value: 19,25 mg/kg

PNEC
Soil
Value: 4,01 mg/kg

8.2 Exposure controls
Engineering measures

Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the 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 Organic Vapors. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators
may not provide adequate protection.

**Hand protection**: The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

**Eye protection**: Eye wash bottle with pure water. Tightly fitting safety goggles.

**Skin and body protection**: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant antistatic protective clothing. Workers should wear antistatic footwear.

**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

#### 9.1 Information on basic physical and chemical properties

**Appearance**

- **Form**: Liquid
- **Physical state**: Liquid
- **Color**: Clear, colorless

**Safety data**

- **Flash point**: -26 °C (-15 °F)  
  Method: closed cup
- **Lower explosion limit**: 2 % (V)
- **Upper explosion limit**: 7 % (V)
- **Oxidizing properties**: no
- **Autoignition temperature**: 272 °C (522 °F)
- **Thermal decomposition**: No data available
- **Molecular formula**: C6H12
- **Molecular weight**: 84.18 g/mol
- **pH**: Not applicable
- **Pour point**: No data available
**Boiling point/boiling range** : 63,5 °C (146,3 °F)

**Vapor pressure** :
- 176,00 MMHG at 24 °C (75 °F)
- 106,30 kPa at 65 °C (149 °F)

**Relative density** : 0,68 at 15 °C (59 °F)

**Density** :
- 645 kg/m³ at 50 °C (122 °F)
- 678 kg/m³ at 15 °C (59 °F)
- 674 g/cm³ at 20 °C (68 °F)

**Water solubility** : 47 MG/L at 20 °C (68 °F) slightly soluble

**Partition coefficient: n-octanol/water** : log Pow: 3,87

**Viscosity, kinematic** : 0,34 cSt at 40 °C (104 °F)

**Relative vapor density** : 2,9 (Air = 1.0)

**Evaporation rate** : No data available

**Percent volatile** : > 99 %

**Conductivity** : 4,1 pSm
Method: ASTM D4308

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

Stable at normal ambient temperature and pressure.

#### 10.2 Chemical stability

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

#### 10.3 Possibility of hazardous reactions
### AlphaPlus® 1-Hexene

**Hazardous reactions**: Further information: No decomposition if stored and applied as directed.

Hazardous reactions: Vapors may form explosive mixture with air.

**10.4 Conditions to avoid**: Heat, flames and sparks.

**10.5 Materials to avoid**: May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

**Thermal decomposition**: No data available

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

### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

**Acute oral toxicity**

1-Hexene: LD50: > 5.600 mg/kg  
Species: Rat  
Sex: male and female  
Method: Fixed Dose Method

**Acute inhalation toxicity**

1-Hexene: LC50: 110.1 mg/l  
Exposure time: 4 h  
Species: Rat  
Sex: male  
Test atmosphere: vapor  
Method: OECD Test Guideline 403

**Acute dermal toxicity**

1-Hexene: LD50: > 2.000 mg/kg  
Species: Rabbit  
Sex: male and female

**AlphaPlus® 1-Hexene Skin irritation**: No skin irritation. Repeated or prolonged contact with the mixture may cause removal of natural fat from the skin resulting in desiccation of the skin.

**AlphaPlus® 1-Hexene Eye irritation**: No eye irritation.

**AlphaPlus® 1-Hexene Sensitization**: Did not cause sensitization on laboratory animals. Information
referred to the main ingredient.

**Repeated dose toxicity**

1-Hexene  
Species: Rat, male  
Sex: male  
Application Route: oral gavage  
Dose: 0, 10, 101, 1010, 3365 mg/kg  
Exposure time: 28 day  
Number of exposures: daily  
NOEL: 101 mg/kg  
Lowest observable effect level: 1.010 mg/kg  
Test substance: yes  
Method: OECD Test Guideline 407

Species: Rat, female  
Sex: female  
Application Route: oral gavage  
Dose: 0, 10, 101, 1010, 3365 mg/kg  
Exposure time: 28 day  
Number of exposures: daily  
NOEL: 1.010 mg/kg  
Lowest observable effect level: 3.365 mg/kg  
Test substance: yes  
Method: OECD Test Guideline 407

Species: Rat  
Application Route: Inhalation  
Dose: 0, 300, 1000, 3000 ppm  
Exposure time: 90 day  
Number of exposures: 6 h/d, 5 d/wk, 13 wk  
NOEL: 3000 ppm  
Test substance: yes

**Genotoxicity in vitro**

1-Hexene  
Test Type: Ames test  
Metabolic activation: with and without metabolic activation  
Method: Mutagenicity (Escherichia coli - reverse mutation assay)  
Result: negative

Test Type: Unscheduled DNA synthesis assay  
Result: negative

Test Type: Mouse lymphoma assay  
Result: negative

Test Type: Chromosome aberration test in vitro  
Method: OECD Guideline 473  
Result: negative

**Genotoxicity in vivo**

1-Hexene  
Test Type: Mouse micronucleus assay  
Species: Mouse  
Method: Mutagenicity (micronucleus test)  
Result: negative
Reproductive toxicity

1-Hexene

Species: Rat
Sex: males
Application Route: oral gavage
Dose: 0, 100, 500, 1000 mg/kg
Number of exposures: daily
Test period: 44 d
Test substance: yes
Method: OECD Guideline 421
NOAEL Parent: 1.000 mg/kg
NOAEL F1: 1.000 mg/kg

Species: Rat
Sex: females
Application Route: oral gavage
Dose: 0, 100, 500, 1000 mg/kg
Number of exposures: daily
Test period: 41-51 d
Test substance: yes
Method: OECD Guideline 421
NOAEL Parent: 1.000 mg/kg
NOAEL F1: 1.000 mg/kg

AlphaPlus® 1-Hexene

Aspiration toxicity

May be fatal if swallowed and enters airways.

CMR effects

1-Hexene

Carcinogenicity: Not available
Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Teratogenicity: Animal testing did not show any effects on fetal development.
Reproductive toxicity: Animal testing did not show any effects on fertility.

AlphaPlus® 1-Hexene

Further information

Solvents may degrease the skin.

SECTION 12: Ecological information

12.1

Toxicity

Toxicity to fish

1-Hexene

LC50: 5.6 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)
semi-static test Test substance: yes
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates

1-Hexene

EC50: 4.4 mg/l
Toxicity to algae

1-Hexene : NOEC: 1.8 mg/l
Exposure time: 96 h
Species: Pseudokirchneriella subcapitata (green algae)
Growth inhibition Method: OECD Test Guideline 201
Information given is based on data obtained from similar substances.

EC50: > 5.5 mg/l
Exposure time: 96 h
Species: Pseudokirchneriella subcapitata (green algae)
Growth inhibition Method: OECD Test Guideline 201
Information given is based on data obtained from similar substances.

12.2 Persistence and degradability

Biodegradability

1-Hexene : 67 - 98 %
Testing period: 28 d
Test substance: yes
According to the results of tests of biodegradability this product is considered as being readily biodegradable.

12.3 Bioaccumulative potential

Bioaccumulation

1-Hexene : This material is not expected to bioaccumulate.

12.4 Mobility in soil

Mobility

1-Hexene : No data available

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

Additional ecological : An environmental hazard cannot be excluded in the event of
ECOTOXICOLOGY ASSESSMENT

Short-term (acute) aquatic hazard
1-Hexene: Toxic to aquatic life.

Long-term (chronic) aquatic hazard
1-Hexene: No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
The information in this SDS pertains only to the product as shipped.

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

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

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

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

SECTION 14: Transport information

14.1 - 14.7 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)
UN2370, 1-HEXENE, 3, II

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN2370, 1-HEXENE, 3, II, (-26 °C)

SDS Number: 100000068730
IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN2370, 1-HEXENE, 3, II

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
UN2370, 1-HEXENE, 3, II, (D/E)

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF
DANGEROUS GOODS (EUROPE))
UN2370, 1-HEXENE, 3, II

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE
OF DANGEROUS GOODS BY INLAND WATERWAYS)
UN2370, 1-HEXENE, 3, II

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

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
National legislation
the European Parliament and of the Council on the Registration, Evaluation, Authorisation and
Restriction of Chemicals (REACH)

15.2 Chemical Safety Assessment
Components : hex-1-ene A Chemical Safety Assessment 209-753-1
has been carried out for this substance.

Notification status
Europe REACH : This product is in full compliance according to REACH
regulation 1907/2006/EC.
Switzerland CH INV : On the inventory, or in compliance with the inventory
United States of America (USA) : On or in compliance with the active portion of the
TSCA TSCA inventory
Canada DSL : All components of this product are on the Canadian
dSL
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 : All substances in this product were registered, notified
to be registered, or exempted from registration by
CPChem through an Only Representative according to
K-REACH regulations. Importation of this product is
permitted if the Korean Importer of Record was
included on CPChem’s notifications or if the Importer of
AlphaPlus® 1-Hexene

Philippines PICCS : On the inventory, or in compliance with the inventory
China IECSC : On the inventory, or in compliance with the inventory
Taiwan TCSI : On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 1
Fire Hazard: 3
Reactivity Hazard: 0

Further information
Legacy SDS Number : PE0016

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>
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</thead>
<tbody>
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<td>ACGIH</td>
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<td>AICS</td>
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<tr>
<td>DSL</td>
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<td>NDSL</td>
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SDS Number:100000068730

15/50
<table>
<thead>
<tr>
<th>IC50</th>
<th>Inhibition Concentration 50%</th>
<th>SARA</th>
<th>Superfund Amendments and Reauthorization Act.</th>
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<tbody>
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<td>IARC</td>
<td>International Agency for Research on Cancer</td>
<td>TLV</td>
<td>Threshold Limit Value</td>
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<td>IECSC</td>
<td>Inventory of Existing Chemical Substances in China</td>
<td>TWA</td>
<td>Time Weighted Average</td>
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<tr>
<td>ENCS</td>
<td>Japan, Inventory of Existing and New Chemical Substances</td>
<td>TSCA</td>
<td>Toxic Substance Control Act</td>
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<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>
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<tr>
<td>&lt;=</td>
<td>Less Than or Equal To</td>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
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<tr>
<td>LC50</td>
<td>Lethal Concentration 50%</td>
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</tbody>
</table>

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

H225 Highly flammable liquid and vapor.
H304 May be fatal if swallowed and enters airways.
H336 May cause drowsiness or dizziness.
Annex

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

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector of use</td>
<td>SU3, SU8, SU9: Industrial Manufacturing (all), 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>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>ERC1, ERC4: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles</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: Manufacture of substances, Industrial use of processing aids in processes and products, not becoming part of articles

(Msafe)  : 166,834 tonnes/day

Environment factors not influenced by risk management

<table>
<thead>
<tr>
<th>Flow rate</th>
<th>18,000 m3/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dilution Factor (River)</td>
<td>40</td>
</tr>
<tr>
<td>Dilution Factor (Coastal Areas)</td>
<td>100</td>
</tr>
</tbody>
</table>

Other given operational conditions affecting environmental exposure

| Number of emission days per year | 300 |
| Emission or Release Factor: Air   | 5 %  |
| Emission or Release Factor: Water | 0,03 % |
| 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 %)
Water: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96,8 %)
Remarks: Prevent discharge of undissolved substance to or recover from wastewater.
Remarks: Do not apply industrial sludge to natural soils.
Remarks: Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent: 2.000 m³/d
Effectiveness (of a measure): 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: 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), 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 non-dedicated facilities, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Use as laboratory reagent

Product characteristics
Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartiment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Number: 100000068730</td>
<td>18/50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>ERC1, ERC4</th>
<th>EUSES</th>
<th>Freshwater</th>
<th>0.0201 mg/L</th>
<th>0.181</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0080 mg/L</td>
<td>0.0722</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>3.54 mg/kg</td>
<td>0.999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.809 mg/kg</td>
<td>0.193</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.323 mg/kg</td>
<td>0.0772</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air</td>
<td>0.232 mg/m3</td>
<td></td>
</tr>
</tbody>
</table>

ERC1: Manufacture of substances
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

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: SU3: Industrial Manufacturing (all)
Process category:
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15: Use as laboratory reagent

Environmental release category: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7: Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario
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, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7: Manufacture of substances, Formulation of preparations, Formulation in materials, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in inclusion into or onto a matrix, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of monomers for manufacture of thermoplastics, Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers, Industrial use of substances in closed systems

(Msafe) : 5.011,707 tonnes/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 : 365
Emission or Release Factor: Air : 0,1 %
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 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96,8 %)
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2.000 m3/d
Effectiveness (of a measure) : 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b,, PROC15: 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), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation
AlphaPlus® 1-Hexene

Product characteristics
Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

| Environment | ERC1: Manufacture of substances | ERC2: Formulation of preparations | ERC3: Formulation in materials | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles | ERC5: Industrial use resulting in inclusion into or onto a matrix | ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) | ERC6b: Industrial use of reactive processing aids | ERC6c: Industrial use of monomers for manufacture of thermoplastics | ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers | ERC7: Industrial use of substances in closed systems |

<table>
<thead>
<tr>
<th>ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7</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>ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>Value type</td>
<td>Level of Exposure</td>
<td>Risk characterization ratio</td>
</tr>
<tr>
<td>ERC1: Manufacture of substances</td>
<td>ERC2: Formulation of preparations</td>
<td>ERC3: Formulation in materials</td>
<td>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</td>
<td>ERC5: Industrial use resulting in inclusion into or onto a matrix</td>
<td>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</td>
</tr>
</tbody>
</table>
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Short title of Exposure Scenario: **Use as an intermediate**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector of use</td>
<td>SU3, SU8, SU9: Industrial Manufacturing (all), 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>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</td>
</tr>
<tr>
<td></td>
<td>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities</td>
</tr>
<tr>
<td></td>
<td>PROC15: Use as laboratory reagent</td>
</tr>
<tr>
<td>Environmental release category</td>
<td>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</td>
</tr>
<tr>
<td>Further information</td>
<td>Use as an isolated intermediate under strictly controlled conditions</td>
</tr>
</tbody>
</table>

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

(Msafe) = 166,837 tonnes/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
AlphaPlus® 1-Hexene

Number of emission days per year : 300
Emission or Release Factor: Air : 2.5 %
Emission or Release Factor: Water : 0.03 %
Emission or Release Factor: Soil : 0.1 %

Technical conditions and measures / Organizational measures
Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 80 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96.8 %)
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2.000 m³/d
Effectiveness (of a measure) : 96.8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: 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), 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 non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities, Use as laboratory reagent

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source
SDS Number:100000068730 23/50
1. Short title of Exposure Scenario: **Formulation**

<table>
<thead>
<tr>
<th>Main User Groups</th>
<th>Sector of use</th>
<th>Process category</th>
<th>Environmental release category</th>
</tr>
</thead>
<tbody>
<tr>
<td>SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites</td>
<td>SU3, SU 10: Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)</td>
<td>PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at dedicated facilities : Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of mixtures or articles by tableting, compression, extrusion, pelletization; Industrial setting; PROC15: Use as laboratory reagent (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>).</td>
<td>ERC2: Formulation of preparations</td>
</tr>
</tbody>
</table>

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).
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Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, 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

(Msafe) : 248,014 tonnes/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 : 2,5 %
Emission or Release Factor: Water : 0,02 %
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: 0 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of z (%):
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment plant effluent : 2.000 m3/d
Effectiveness (of a measure) : 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC14, PROC15: 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), 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 non-dedicated facilities, 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 tableting, compression, extrusion, pelletization; Industrial setting; Use as laboratory reagent

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Product characteristics
Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Compartment</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC2</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.0268 mg/L</td>
<td>0.241</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0027 mg/L</td>
<td>0.0241</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>1.19 mg/kg</td>
<td>0.336</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>1.08 mg/kg</td>
<td>0.258</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.108 mg/kg</td>
<td>0.0258</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.579 mg/m3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC2: Formulation of preparations

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Short title of Exposure Scenario: Lubricants - Industrial

Main User Groups: SU 3: Industrial uses: Uses of substances as such or in

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Sector of use : SU3: Industrial Manufacturing (all)
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
  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
  PROC17: Lubrication at high energy conditions and in partly open process
  PROC18: Greasing at high energy conditions

Environmental release category : ERC4, ERC7: Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of substances in closed systems

Further information : Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.

2.1 Contributing scenario controlling environmental exposure for:ERC4, ERC7: Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of substances in closed systems

(Msafe) : 805,271 tonnes/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 : 0,1 %
Emission or Release Factor: Water : 0,003 %
Emission or Release Factor: Soil : 0,1 %

Technical conditions and measures / Organizational measures
Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 70 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to
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provide the required removal efficiency of ≥ (%):
(Effectiveness: 96,8 %)

Remarks
Prevent discharge of undissolved substance to or recover from wastewater.

Remarks
Do not apply industrial sludge to natural soils.

Remarks
Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2.000 m³/d
Effectiveness (of a measure) : 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC17, PROC18: 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), Use in batch and other process (synthesis) where opportunity for exposure arises, Industrial spraying, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, 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), Roller application or brushing, Treatment of articles by dipping and pouring, Lubrication at high energy conditions and in partly open process, Greasing at high energy conditions

Product characteristics
Remarks
Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

Environment

<table>
<thead>
<tr>
<th>Contributing Exposure Assessment</th>
<th>Specific Compart</th>
<th>Value type</th>
<th>Level of Risk characterization</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS Number:100000068730</td>
<td>28/50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC7: Industrial use of substances in closed systems

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

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Short title of Exposure Scenario: Lubricants - Professional

Main User Groups : SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Sector of use : SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process category : PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC10: Roller application or brushing
PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring
PROC17: Lubrication at high energy conditions and in partly open process
PROC18: Greasing at high energy conditions
PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release category : ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor
use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

Further information: Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

(Msafe) : 0,873 tonnes/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 : 60 %
Emission or Release Factor: Water : 5 %
Emission or Release Factor: Soil : 5 %

Technical conditions and measures / Organizational measures
Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 0 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%):
(Effectiveness: 96,8 %)
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2,000 m³/d
Effectiveness (of a measure) : 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC17, PROC18, PROC20: 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), 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 non-dedicated facilities, 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), Roller application or brushing, Non industrial spraying, Treatment of articles by dipping and pouring, Lubrication at high energy conditions and in partly open process, Greasing at high energy conditions, Heat and pressure transfer fluids in dispersive, professional use but closed systems

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<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>Freshwater</td>
<td>ERC8a, ERC8d, ERC9a, ERC9b</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.131 µg/L</td>
<td>0.00118</td>
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</tr>
<tr>
<td>Marine water</td>
<td></td>
<td></td>
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<td>Marine water</td>
<td>0.0123 µg/L</td>
<td>0.00011</td>
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<tr>
<td>Soil</td>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>0.0008 mg/kg</td>
<td>0.00107</td>
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<tr>
<td>Freshwater sediment</td>
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<td></td>
<td>Freshwater sediment</td>
<td>0.0053 mg/kg</td>
<td>0.00126</td>
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<tr>
<td>Marine sediment</td>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.496 µg/kg</td>
<td>0.000119</td>
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<tr>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.179 µg/m3</td>
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<td></td>
</tr>
</tbody>
</table>

ERC8a: Wide dispersive indoor use of processing aids in open systems
ERC8d: Wide dispersive outdoor use of processing aids in open systems
ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Short title of Exposure Scenario: **Lubricants - Consumer**

- **Main User Groups**: SU 21: Consumer uses: Private households (= general public = consumers)
- **Sector of use**: SU 21: Consumer uses: Private households (= general public = consumers)
- **Product category**: PC1: Adhesives, sealants
  PC24: Lubricants, greases, release products
  PC31: Polishes and wax blends
- **Environmental release category**: ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems
- **Further information**: Covers the consumer use of formulated lubricants in closed and open systems including transfer operations, application, operation of engines and similar articles, equipment maintenance and disposal of waste oil.

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

- **Product characteristics**
  (Msafe): 0.804 tonnes/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: 365
  - Emission or Release Factor: Air: 60%
  - Emission or Release Factor: Water: 5%
  - Emission or Release Factor: Soil: 5%

- **Technical conditions and measures / Organizational measures**
  - Air: Treat air emission to provide a typical removal efficiency of
AlphaPlus® 1-Hexene

Water: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96.8 %)

Remarks: Prevent discharge of undissolved substance to or recover from wastewater.

Remarks: Do not apply industrial sludge to natural soils.

Remarks: Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent: 2,000 m³/d
Effectiveness (of a measure): 96.8 %
Procedures to limit air emissions from Sewage Treatment Plant:

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.

2.2 Contributing scenario controlling consumer exposure for: PC1, PC24, PC31: Adhesives, sealants, Lubricants, greases, release products, Polishes and wax blends

Product characteristics
Remarks: Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks: Not applicable

Other given operational conditions affecting consumers 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 protection of consumer (e.g. behavioral advice, personal protection and hygiene)
Consumer Measures: Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<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>ERC8a, ERC8d, ERC9a, ERC9b</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.116 µg/L</td>
<td>0.00104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000068730 33/50
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

1. Short title of Exposure Scenario: **Metal working fluids / rolling oils - Industrial**

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

   **Sector of use:** SU3: Industrial Manufacturing (all)

   **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)
   - 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
   - PROC17: Lubrication at high energy conditions and in partly open process

   **Environmental release category:** ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
Further information: Covers the use in formulated MWFs/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.

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

(Msafe): 1.027,13 tonnes/day

<table>
<thead>
<tr>
<th>Environment factors not influenced by risk management</th>
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</thead>
<tbody>
<tr>
<td>Flow rate</td>
</tr>
<tr>
<td>Dilution Factor (River)</td>
</tr>
<tr>
<td>Dilution Factor (Coastal Areas)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other given operational conditions affecting environmental exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of emission days per year</td>
</tr>
<tr>
<td>Emission or Release Factor: Air</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical conditions and measures / Organizational measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
</tr>
<tr>
<td>Treat air emission to provide a typical removal efficiency of (%)</td>
</tr>
<tr>
<td>(Effectiveness: 70 %)</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%) (Effectiveness: 96.8 %)</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Prevent discharge of undissolved substance to or recover from wastewater.</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Do not apply industrial sludge to natural soils.</td>
</tr>
<tr>
<td>Remarks</td>
</tr>
<tr>
<td>Sludge should be incinerated, contained or reclaimed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to municipal sewage treatment plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate of sewage treatment plant effluent</td>
</tr>
<tr>
<td>Effectiveness (of a measure)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditions and measures related to external treatment of waste for disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste treatment</td>
</tr>
</tbody>
</table>

### 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4,, PROC7, PROC8a, PROC8b,, PROC10, PROC13, PROC17: 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), 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), Industrial spraying, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small
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containers (dedicated filling line, including weighing), Roller application or brushing,
Treatment of articles by dipping and pouring, Lubrication at high energy conditions and
in partly open process

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with
product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact
with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin
contamination immediately. Provide basic employee training to prevent / minimise exposures and to
report any skin problems that may develop., No other specific measures identified.

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>Freshwater</td>
<td>Soil</td>
<td>0.0018 mg/kg</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>Freshwater sediment</td>
<td>0.0034 mg/kg</td>
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<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>Air</td>
<td>0.308 µg/kg</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.0013 mg/m3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

1. Short title of Exposure Scenario: Metal working fluids / rolling oils – Professional

Main User Groups : SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sector of use : SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
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

PROC10: Roller application or brushing

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC17: Lubrication at high energy conditions and in partly open process

Environmental release category: 

ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

Further information:

Covers the use in formulated MWFs including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/reject articles, and disposal of waste oils.

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d, ERC9a, ERC9b: Wide dispersive indoor use of processing aids in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

(Msafe) : 1,006 tonnes/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 : 60 %
Emission or Release Factor: Water : 5 %
Emission or Release Factor: Soil : 5 %

Technical conditions and measures / Organizational measures

Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 0 %)

Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96,8 %)
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Remarks:
- Prevent discharge of undissolved substance to or recover from wastewater.
- Do not apply industrial sludge to natural soils.
- Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
- Flow rate of sewage treatment plant effluent: 2,000 m³/d
- Effectiveness (of a measure): 96.8%

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC17: 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), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, 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), Roller application or brushing, Non industrial spraying, Treatment of articles by dipping and pouring, Lubrication at high energy conditions and in partly open process.

Product characteristics
- Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent/limit releases, dispersion and exposure
- Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop., No other specific measures identified.

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>ERC8a, ERC8d, ERC9a, ERC9b</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.175 µg/L</td>
<td>0.00158</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0168 µg/L</td>
<td>0.000151</td>
<td></td>
</tr>
</tbody>
</table>

SDS Number: 100000068730  38/50
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

1. Short title of Exposure Scenario: **Use as a fuel - industrial**

   - **Main User Groups**: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
   - **Sector of use**: SU3: Industrial Manufacturing (all)
   - **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
     - PROC16: Using material as fuel sources, limited exposure to unburned product to be expected
   - **Environmental release category**: ERC7: Industrial use of substances in closed systems
   - **Further information**: Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2.1 Contributing scenario controlling environmental exposure for:ERC7: Industrial use of substances in closed systems

   - (Msafe): 1,484,848 tonnes/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
### AlphaPlus® 1-Hexene

**SAFETY DATA SHEET**

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| Emission or Release Factor: Air     | 5 %                        |
| Emission or Release Factor: Water  | 0,001 %                     |
| Emission or Release Factor: Soil   | 0 %                        |

**Technical conditions and measures / Organizational measures**

**Air**: Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 95 %)

**Water**: Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96.8 %)

**Remarks**: Prevent discharge of undissolved substance to or recover from wastewater.

**Remarks**: Do not apply industrial sludge to natural soils.

**Remarks**: Sludge should be incinerated, contained or reclaimed.

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

- **Flow rate of sewage treatment plant effluent**: 2,000 m³/d
- **Effectiveness (of a measure)**: 96.8 %

**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.

2.2 **Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16:** 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), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Using material as fuel sources, limited exposure to unburned product to be expected

**Product characteristics**

**Remarks**: Liquid, vapour pressure > 10 kPa at STP

**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.

**Organizational measures to prevent /limit releases, dispersion and exposure**

Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

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

**SDS Number**: 100000068730
## 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>ERC7</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.0582 µg/L</td>
<td>0.000525</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Soil</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0023 mg/kg</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.203 µg/kg</td>
<td>0.000049</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air</td>
<td>0.565 µg/m³</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC7: Industrial use of substances in closed systems

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

1. **Short title of Exposure Scenario:** Use as a fuel – professional

   - **Main User Groups:** SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
   - **Sector of use:** SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
   - **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
     - PROC16: Using material as fuel sources, limited exposure to unburned product to be expected

   - **Environmental release category:** ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

   - **Further information:** Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

2. **Contributing scenario controlling environmental exposure for:** ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

   - **(Msafe):** 3,899 tonnes/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**: 1 %
- **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: 0 %)
- **Water**
  - Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96.8 %)
- **Remarks**
  - Prevent discharge of undissolved substance to or recover from wastewater.
- **Remarks**
  - Do not apply industrial sludge to natural soils.
- **Remarks**
  - Sludge should be incinerated, contained or reclaimed.

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

- **Flow rate of sewage treatment plant effluent**: 2,000 m³/d
- **Effectiveness (of a measure)**: 96.8 %

### 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.

### 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16: 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), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities, Using material as fuel sources, limited exposure to unburned product to be expected

### Product characteristics

- **Remarks**
  - Liquid, vapour pressure > 10 kPa at STP

### 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.

### Organizational measures to prevent/limit releases, dispersion and exposure
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Do not ingest. If swallowed then seek immediate medical assistance. Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. No other specific measures identified.

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>ERC9a, ERC9b</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.0452 µg/L</td>
<td>0.000408</td>
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<tr>
<td></td>
<td></td>
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<td>Marine water</td>
<td>0.0037 µg/L</td>
<td>0.00034</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>0.0092 µg/kg</td>
<td>0.000003</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0018 mg/kg</td>
<td>0.000436</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.15 µg/kg</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.0045 µg/m³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

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

1. Short title of Exposure Scenario: **Functional Fluids - Industrial**

   Main User Groups : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
   Sector of use : SU3: Industrial Manufacturing (all)
   Process category : PROC1: Use in closed process, no likelihood of exposure
   PROC2: Use in closed, continuous process with occasional controlled exposure
   PROC3: Use in closed batch process (synthesis or formulation)
   PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
   PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
   PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
   : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

   Environmental release category : ERC7: Industrial use of substances in closed systems

   Further information : Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.
2.1 Contributing scenario controlling environmental exposure for: ERC7: Industrial use of substances in closed systems

(Msafe) : 1.027,13 tonnes/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 : 1 %
Emission or Release Factor: Water : 0,003 %
Emission or Release Factor: Soil : 0,3 %

Technical conditions and measures / Organizational measures
Air : Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 0 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of z (%):
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant
Flow rate of sewage treatment plant effluent : 2.000 m3/d
Effectiveness (of a measure) : 96,8 %

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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b,: 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), 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 non-dedicated facilities, 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)

Product characteristics
Remarks : Liquid, vapour pressure > 10 kPa at STP

Amount used
Remarks : Not applicable

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

Organizational measures to prevent /limit releases, dispersion and exposure

Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

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>ERC7</td>
<td>EUSES</td>
<td></td>
<td>Freshwater</td>
<td>0.0843 µg/L</td>
<td>0.000759</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0076 µg/L</td>
<td>0.000069</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
<td>0.0018 mg/kg</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0034 mg/kg</td>
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<td></td>
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<td>Marine sediment</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Air</td>
<td>0.0023 mg/m3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ERC7: Industrial use of substances in closed systems

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

1. Short title of Exposure Scenario: Functional Fluids - Professional

Main User Groups: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Sector of use: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

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

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

PROC8a: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release category: ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in

SDS Number: 100000068730 45/50
**Further information:** Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.

### 2.1 Contributing scenario controlling environmental exposure for: ERC9a, ERC9b: Wide dispersive indoor use of substances in closed systems, Wide dispersive outdoor use of substances in closed systems

(Msafe) : 1,604 tonnes/day

**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>5 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Water</td>
<td>2,5 %</td>
</tr>
<tr>
<td>Emission or Release Factor: Soil</td>
<td>2,5 %</td>
</tr>
</tbody>
</table>

**Technical conditions and measures / Organizational measures**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Treat air emission to provide a typical removal efficiency of (%): (Effectiveness: 0 %)</td>
</tr>
<tr>
<td>Water</td>
<td>Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96,8 %)</td>
</tr>
<tr>
<td>Remarks</td>
<td>Prevent discharge of undissolved substance to or recover from wastewater.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Do not apply industrial sludge to natural soils.</td>
</tr>
<tr>
<td>Remarks</td>
<td>Sludge should be incinerated, contained or reclaimed.</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>Flow rate of sewage treatment</td>
<td>2,000 m³/d</td>
</tr>
<tr>
<td>Effectiveness (of a measure)</td>
<td>96,8 %</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Condition</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>

**2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a,, PROC20**: 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), Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Heat and pressure transfer fluids in dispersive, professional use but closed systems
AlphaPlus® 1-Hexene

Version 3.7
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Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

3. Exposure estimation and reference to its source

<table>
<thead>
<tr>
<th>Environment</th>
<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>ERC9a, ERC9b</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.110 µg/L</td>
<td>0.000994</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine water</td>
<td>0.0102 µg/L</td>
<td>0.000092</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>0.0029 mg/kg</td>
<td>0.000812</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>0.0044 mg/kg</td>
<td>0.00106</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.413 µg/kg</td>
<td>0.000099</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air</td>
<td>0.0226 µg/m³</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

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

1. Short title of Exposure Scenario: Use in polymer production – industrial

Main User Groups: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use: SU3, SU 10: Industrial Manufacturing (all), Formulation [mixing] of preparations and/ or re-packaging (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

SDS Number: 100000068730 47/50
opportunity for exposure arises:

PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC 6: Calendering operations
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC 14: Production of mixtures or articles by tableting, compression, extrusion, pelletization; Industrial setting;
PROC 15: Use as laboratory reagent

Environmental release category: ERC4, ERC6c: Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of monomers for manufacture of thermoplastics

Further information:
Manufacture of polymers from monomers in continuous and batch processes, include sparging, discharging, and reactor maintenance and immediate polymer product formation (i.e. compounding, pelletisation, product off-gassing).

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC6c: Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of monomers for manufacture of thermoplastics

(Msafe) : 171,467 tonnes/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 : 1 %
Emission or Release Factor: Water : 0,03 %
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: 80 %)
Water : Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%): (Effectiveness: 96,8 %)
Remarks : Prevent discharge of undissolved substance to or recover from wastewater.
Remarks : Do not apply industrial sludge to natural soils.
Remarks : Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage treatment : 2,000 m3/d
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Version 3.7

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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.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC6, PROC8a, PROC8b, PROC14, PROC15: 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), 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), Calendering operations, Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities, Production of mixtures or articles by tableting, compression, extrusion, pelletization; Industrial setting; Use as laboratory reagent.

Product characteristics
Remarks: Liquid, vapour pressure > 10 kPa at STP

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.

Organizational measures to prevent /limit releases, dispersion and exposure
Do not ingest. If swallowed then seek immediate medical assistance., Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop., No other specific measures identified.

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, ERC6c</td>
<td>EUSES</td>
<td>Freshwater</td>
<td>0.0391 mg/L</td>
<td>0.352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERC4, ERC6c</td>
<td>EUSES</td>
<td>Marine water</td>
<td>0.0039 mg/L</td>
<td>0.0352</td>
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<tr>
<td></td>
<td></td>
<td>Soil</td>
<td>1.72 mg/kg</td>
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<tr>
<td></td>
<td></td>
<td>Freshwater sediment</td>
<td>1.58 mg/kg</td>
<td>0.376</td>
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<tr>
<td></td>
<td></td>
<td>Marine sediment</td>
<td>0.157 mg/kg</td>
<td>0.0376</td>
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<tr>
<td></td>
<td></td>
<td>Air</td>
<td>0.0452 mg/m3</td>
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</tr>
</tbody>
</table>

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC6c: Industrial use of monomers for manufacture of thermoplastics

SDS Number: 100000068730
4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario