SAFETY DATA SHEET

Isononanoic acid
10310

Version / Revision 4.01
Supersedes Version 4.00***
Revision Date 30-Oct-2018
Issuing date 30-Oct-2018

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

1.1. Product identifier

Identification of the substance/preparation  Isononanoic acid
Chemical Name  3,5,5-Trimethylhexanoic acid
CAS-No  3302-10-1
EC No.  221-975-0
Registration number (REACH)  01-2119517580-45

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

Identified uses  Intermediate
                 Formulation
                 Distribution of substance
                 Functional Fluids
                 Lubricants and lubricant additives
                 Metal working fluids / rolling oils
                 Laboratory chemicals

Uses advised against  None

1.3. Details of the supplier of the safety data sheet

Company/Undertaking  OXEA GmbH
Identification  Rheinpromenade 4A
                D-40789 Monheim
                Germany

Product Information  Product Stewardship
                   FAX: +49 (0)208 693 2053
                   email: psq@oxea-chemicals.com

1.4. Emergency telephone number

Emergency telephone number  +44 (0) 1235 239 670 (UK)
 available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified based on Directive 1272/2008/EC and its amendments (CLP Regulation)

- Acute oral toxicity  Category 4, H302
- Skin corrosion/irritation  Category 2, H315
- Serious eye damage/eye irritation  Category 1, H318
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Additional information
For full text of Hazard- and EU Hazard-statements see SECTION 16.

2.2. Label elements
Labelling according to Regulation 1272/2008/EC and its amendments (CLP Regulation).

Hazard pictograms

Signal word Danger

Hazard statements
H302: Harmful if swallowed.
H315: Causes skin irritation.
H318: Causes serious eye damage.

Precautionary statements
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P330: IF SWALLOWED: Rinse mouth
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several
minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor.

2.3. Other hazards
Vapour/air-mixtures are explosive at intense warming

PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic
(PBT), nor very persistent nor very bioaccumulating (vPvB)

SECTION 3: Composition / information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>REACH-No</th>
<th>1272/2008/EC</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid</td>
<td>3302-10-1</td>
<td>01-2119517580-45</td>
<td>Acute Tox. 4; H302</td>
<td>88 - 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Irrit. 2; H315</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Dam. 1; H318</td>
<td></td>
</tr>
</tbody>
</table>

Remarks
Mixture of isomeric Isononanoic acids, mainly 3,5,5-Trimethylhexanoic acid.
For full text of Hazard- and EU Hazard-statements see SECTION 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

**Skin**
Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

**Eyes**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

**Ingestion**
Call a physician immediately. Do not induce vomiting without medical advice.

### 4.2. Most important symptoms and effects, both acute and delayed

**Main symptoms**
cough, headache, nausea, shortness of breath.

**Special hazard**
Lung irritation, Lung oedema.

### 4.3. Indication of any immediate medical attention and special treatment needed

**General advice**
Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Treat symptomatically. If ingested, flush stomach and compensate acidosis.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

**Suitable extinguishing media**
foam, dry chemical, carbon dioxide (CO2), water spray

**Unsuitable Extinguishing Media**
Do not use a solid water stream as it may scatter and spread fire.

#### 5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Vapour/air-mixtures are explosive at intense warming
Vapours are heavier than air and may spread along floors

#### 5.3. Advice for firefighters

**Special protective equipment for firefighters**
Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

**Precautions for firefighting**
Cool containers / tanks with water spray. Water run-off and vapor cloud may be corrosive. Dike and collect water
used to fight fire. Keep people away from and upwind of fire.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: For personal protective equipment see section 8. Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.

For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

6.3. Methods and material for containment and cleaning up

Methods for containment
Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Further info may be available in the appropriate Exposure scenarios in the annex to this SDS.

Advice on safe handling
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment
See Section 8: Environmental exposure controls.

Incompatible products
bases
amines

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material. Vapour/air-mixtures are explosive at intense warming.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Keep at temperatures between 0 and 38 °C (32 and 100 °F).

Suitable material
stainless steel

Unsuitable material
mild steel, copper, brass, including their alloys

Temperature class
T2

7.3. Specific end use(s)
Intermediate
Formulation
Distribution of substance
Functional Fluids
Lubricants and lubricant additives
Metal working fluids / rolling oils
laboratory chemicals
For specific end use information see the annex of this safety data sheet

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits European Union
No exposure limits established.

Exposure limits UK
No exposure limits established.

DNEL & PNEC

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1
Workers

<table>
<thead>
<tr>
<th>Condition</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN(M)EL - long-term exposure - systemic effects - Inhalation</td>
<td>7 mg/m³</td>
</tr>
<tr>
<td>DN(M)EL - acute / short-term exposure - systemic effects - Inhalation</td>
<td>No hazard identified</td>
</tr>
<tr>
<td>DN(M)EL - long-term exposure - local effects - Inhalation</td>
<td>No hazard identified</td>
</tr>
<tr>
<td>DN(M)EL - acute / short-term exposure - local effects - Inhalation</td>
<td>No hazard identified</td>
</tr>
<tr>
<td>DN(M)EL - long-term exposure - systemic effects - Dermal</td>
<td>3*** mg/kg bw/day***</td>
</tr>
<tr>
<td>DN(M)EL - acute / short-term exposure - systemic effects - Dermal</td>
<td>No hazard identified</td>
</tr>
</tbody>
</table>
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DN(M)EL - long-term exposure - local effects - Dermal
Low hazard (no threshold derived)

DN(M)EL - acute / short-term exposure - local effects - Dermal
Low hazard (no threshold derived)

DN(M)EL - local effects - eyes
Medium hazard (no threshold derived)

General population

DN(M)EL - long-term exposure - systemic effects - Inhalation
2.6*** mg/m³

DN(M)EL - acute / short-term exposure - systemic effects - Inhalation
No hazard identified

DN(M)EL - long-term exposure - local effects - Inhalation
No hazard identified

DN(M)EL - acute / short-term exposure - local effects - Inhalation
No hazard identified

DN(M)EL - long-term exposure - systemic effects - Dermal
1.5*** mg/kg bw/day

DN(M)EL - acute / short-term exposure - systemic effects - Dermal
No hazard identified

DN(M)EL - long-term exposure - local effects - Dermal
Low hazard (no threshold derived)

DN(M)EL - acute / short-term exposure - local effects - Dermal
Low hazard (no threshold derived)

DN(M)EL - long-term exposure - systemic effects - Oral
1.5*** mg/kg bw/day

DN(M)EL - acute / short-term exposure - systemic effects - Oral
Low hazard (no threshold derived)

DN(M)EL - local effects - eyes
Medium hazard (no threshold derived)

Environment

PNEC aqua - freshwater
0.068 mg/l

PNEC aqua - marine water
0.0068*** mg/l

PNEC aqua - intermittent releases
1.36 mg/l

PNEC STP
23 mg/l

PNEC sediment - freshwater
0.904 mg/kg

PNEC sediment - marine water
0.0904*** mg/kg

PNEC Air
No hazard identified

PNEC soil
0.141 mg/kg

Secondary poisoning
No potential for bioaccumulation

8.2. Exposure controls

Special adaptations (REACH)
Not applicable.

Appropriate Engineering controls
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General industrial hygiene practice
Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.
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Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection
Safety glasses with side-shields. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.
Equipment should conform to EN 166

Hand protection
Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Suitable material  nitrile rubber
Evaluation  according to EN 374: level 6
Glove thickness  approx 0,55 mm
Break through time  > 480 min

Suitable material  polyvinylchloride
Evaluation  Information derived from practical experience
Glove thickness  approx 0.8 mm

Skin and body protection
Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Environmental exposure controls
If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

Additional advice
Further details on substance data can be found in the registration dossier under the following link: http://echa.europa.eu/information-on-chemicals/registered-substances. For specific exposure controls see the annex to this safety data sheet.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid @ 20 °C (68 °F)</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>colourless</td>
<td></td>
</tr>
<tr>
<td>Odour</td>
<td>slightly acidic</td>
<td></td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>4.4 (0.1 g/l in water @ 20 °C (68 °F)) DIN 19268</td>
<td></td>
</tr>
<tr>
<td>Melting point/range</td>
<td>approx. -77 °C (Pour point)</td>
<td>DIN ISO 3016</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>236 °C @ 1013 hPa</td>
<td>OECD 103</td>
</tr>
<tr>
<td>Flash point</td>
<td>117 °C</td>
<td>ISO 2719, @ 1013 hPa</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Does not apply, the substance is a liquid</td>
<td></td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>1,2 Vol %</td>
<td></td>
</tr>
</tbody>
</table>

Great Britain (E-GB) /EN
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Upper explosion limit No data available

Vapour pressure

<table>
<thead>
<tr>
<th>Values [hPa]</th>
<th>Values [kPa]</th>
<th>Values [atm]</th>
<th>@ °C</th>
<th>@ °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,0046</td>
<td>0,00046</td>
<td>&lt; 0,001</td>
<td>20</td>
<td>68</td>
</tr>
<tr>
<td>4,5</td>
<td>0,45</td>
<td>0,004</td>
<td>50</td>
<td>122</td>
</tr>
</tbody>
</table>

Vapour density No data available

Relative density

<table>
<thead>
<tr>
<th>Values</th>
<th>@ °C</th>
<th>@ °F</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,900</td>
<td>20</td>
<td>68</td>
<td>DIN 51757</td>
</tr>
<tr>
<td>0,876</td>
<td>50</td>
<td>122</td>
<td>DIN 51757</td>
</tr>
</tbody>
</table>

Solubility 0,7 g/l @ 20 °C, in water, OECD 105

log Pow 3,2 (measured), OECD 117

Autoignition temperature 320 - 415 °C

<table>
<thead>
<tr>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 51794 @ 1009 hPa</td>
</tr>
</tbody>
</table>

Decomposition temperature No data available

Viscosity 11,47 mPa*s @ 20 °C

<table>
<thead>
<tr>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN 51562, dynamic</td>
</tr>
</tbody>
</table>

Explosive properties Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties

Oxidizing properties Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties

9.2. Other information

Molecular weight 158,23

Molecular formula C9 H18 O2

log Koc 2,9 @ pH 4, 1,99 @ pH 7, calculated

Dissoziation constant pKa not determinable due to low water solubility @ 20°C (68°F) OECD 112

Refractive index 1,429 @ 20 °C

Surface tension 35,3 mN/m (0,63 g/l @ 20°C (68°F)), OECD 115

SECTION 10: Stability and Reactivity

10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials
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bases, amines.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure: Ingestion, Inhalation, Eye contact, Skin contact

<table>
<thead>
<tr>
<th>Acute toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid (3302-10-1)</td>
</tr>
<tr>
<td>Routes of Exposure</td>
</tr>
<tr>
<td>Oral</td>
</tr>
<tr>
<td>Dermal</td>
</tr>
</tbody>
</table>

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

Assessment

The available data lead to the classification given in section 2

For acute inhalation toxicity, no data are available

<table>
<thead>
<tr>
<th>Irritation and corrosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid (3302-10-1)</td>
</tr>
<tr>
<td>Target Organ Effects</td>
</tr>
<tr>
<td>Skin</td>
</tr>
<tr>
<td>Eyes</td>
</tr>
</tbody>
</table>

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

Assessment

The available data lead to the classification given in section 2

For respiratory irritation, no data are available

<table>
<thead>
<tr>
<th>Sensitization</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid (3302-10-1)</td>
</tr>
<tr>
<td>Target Organ Effects</td>
</tr>
<tr>
<td>Skin</td>
</tr>
</tbody>
</table>

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

Assessment

Based on available data, the classification criteria are not met for:

Skin sensitization

For respiratory sensitization, no data are available***

<table>
<thead>
<tr>
<th>Subacute, subchronic and prolonged toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid (3302-10-1)</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Subacute toxicity</td>
</tr>
</tbody>
</table>

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

Assessment

Based on available data, the classification criteria are not met for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity
3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Dose</th>
<th>Species</th>
<th>Evaluation</th>
<th>Method</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutagenicity</td>
<td></td>
<td>Salmonella typhimurium</td>
<td>negative</td>
<td>OECD 471 (Ames)</td>
<td>In vitro study</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td></td>
<td>Escherichia coli</td>
<td>negative</td>
<td>OECD 472</td>
<td>In vitro study</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td></td>
<td>CHO (Chinese Hamster Ovary)</td>
<td>ambiguous</td>
<td>OECD 473 (Chromosomal Aberration)</td>
<td>In vitro study</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td></td>
<td>V79 cells, Chinese hamster</td>
<td>negative</td>
<td>OECD 476 (Mammalian Gene Mutation)</td>
<td>In vitro study</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>LOAEL 165 - 500</td>
<td>rat, parental, female</td>
<td></td>
<td>OECD 415</td>
<td>Oral</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>NOAEL 79 - 228</td>
<td>rat, parental, female</td>
<td></td>
<td>OECD 415</td>
<td>Oral</td>
</tr>
<tr>
<td>Developmental Toxicity</td>
<td>NOAEL 60</td>
<td>rat</td>
<td></td>
<td>OECD 414, Oral</td>
<td>Oral</td>
</tr>
</tbody>
</table>

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1
CMR Classification
The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B***

Evaluation
In vitro tests did not show mutagenic effects***

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1
Main symptoms
cough, headache, nausea, shortness of breath.

Target Organ Systemic Toxicant - Single exposure
Based on available data, the classification criteria are not met for:
STOT SE***

Target Organ Systemic Toxicant - Repeated exposure
Based on available data, the classification criteria are not met for:
STOT RE

Aspiration toxicity
no data available***

Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity
3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Species</th>
<th>Exposure time</th>
<th>Dose</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oncorhynchus mykiss</td>
<td>96h</td>
<td>LC50: 123 mg/l</td>
<td>OECD 203</td>
</tr>
</tbody>
</table>
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Activated sludge (bacteriae) 3 h EC50: 470 mg/l OECD 209
Daphnia magna (Water flea) 48h EC50: 68 mg/l OECD 202
Pseudokirchneriella subcapitata 72h EC50: 81 mg/l (Growth rate) OECD 201
Pseudokirchneriella subcapitata 72h EC50: 51 mg/l (Biomass) OECD 201

Long term toxicity
3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Species</th>
<th>Dose</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic toxicity</td>
<td>Pseudokirchneriella subcapitata</td>
<td>NOEC: 10 mg/l</td>
<td>OECD 201</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

Biodegradation
96 % (21*** d), activated sludge, domestic, non-adapted, aerobic, OECD 301 A / ISO 7827.***

Abiotic Degradation
3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Result</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrolysis</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Photolysis</td>
<td>Rate constant: 0,52-1 x 10^(-11) cm^3/(molecule x s)</td>
<td>calculated</td>
</tr>
</tbody>
</table>

12.3. Bioaccumulative potential

3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Result</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>log Pow</td>
<td>3,2</td>
<td>measured, OECD 117</td>
</tr>
<tr>
<td>BCF</td>
<td>3,1 - 7 @ 0,1 mg/l</td>
<td>OECD 305 C</td>
</tr>
<tr>
<td>BCF</td>
<td>0,5 - 1,7 @ 1 mg/l</td>
<td>OECD 305 C</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil

3,5,5-Trimethylhexanoic acid (3302-10-1)

<table>
<thead>
<tr>
<th>Type</th>
<th>Result</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface tension</td>
<td>35,3 mN/m (0,63 g/l @ 20°C (68°F))</td>
<td>OECD 115</td>
</tr>
<tr>
<td>Distribution to environmental compartments</td>
<td>Soil: 12,6 %</td>
<td>calculated</td>
</tr>
<tr>
<td>Adsorption/Desorption</td>
<td>log Koc: 2,9 @ pH 4</td>
<td>calculated</td>
</tr>
<tr>
<td>Adsorption/Desorption</td>
<td>log Koc: 1,99 @ pH 7</td>
<td>calculated</td>
</tr>
</tbody>
</table>

12.5. Results of PBT and vPvB assessment

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1

PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)***
12.6. Other adverse effects

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1
No data available**

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.
Hazardous waste according to European Waste Catalogue (EWC)

Uncleaned empty packaging
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

Section 14.1 - 14.6

ADR/RID
Not restricted

ADN
ADN Container
Not restricted

ADN
ADN Tanker

14.1. UN number
ID 9006
14.2. UN proper shipping name
Environmentally hazardous substance, liquid, n.o.s.
14.3. Transport hazard class(es)
9
N3, F
14.4. Packing group
-
14.5. Environmental hazards
Fish and tree
no data available

ICAO-TI / IATA-DGR
Not restricted

IMDG
Not restricted

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Product name
Nonanoic acid
Ship type
3
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Pollution category

SECTION 15: Regulatory information

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

Regulation 1272/2008, Annex VI
not listed

DI 2012/18/EU (Seveso III)
Category
not subject

DI 1999/13/EC (VOC Guideline)

<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1</td>
<td>not subject</td>
</tr>
</tbody>
</table>

International Inventories

3,5,5-Trimethylhexanoic acid, CAS: 3302-10-1
- AICS (AU)***
- DSL (CA)***
- IECSC (CN)***
- EC-No. 2219750 (EU)***
- ENCS (2)-608 (JP)***
- ISHL (2)-608 (JP)***
- KECI KE-34559 (KR)***
- PICCS (PH)***
- TSCA (US)***
- NZIoC-NZ May be used as single component chemical***
- TCSI (TW)***

National regulatory information Great Britain

Releases to air (Pollution Inventory Substances)
not subject

Releases to water (Pollution Inventory Substances)
not subject

Releases to sewer (Pollution Inventory Substances)
not subject
For details and further information please refer to the original regulation***

15.2. Chemical safety assessment

The Chemical Safety Report (CSR) has been generated. For Exposure Scenarios see the annex.
SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3
H302: Harmful if swallowed.
H315: Causes skin irritation.
H318: Causes serious eye damage.

Abbreviations
A table of terms and abbreviations can be found under the following link:

Training advice
For effective first-aid, special training / education is needed.

Sources of key data used to compile the datasheet
Information contained in this safety data sheet is based on Oxea owned data and public sources deemed valid or acceptable. The absence of data elements required by OSHA, ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet
Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the Oxea homepage (www.oxea-chemicals.com).

Disclaimer
For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Oxea makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

End of Safety Data Sheet

Annex to the extended Safety Data Sheet (eSDS)

General information
Acute Health Hazard:
Qualitative approach used to conclude safe use.

For specific information regarding the SPERC used please refer to the ESIG webpage
www.esig.org/en/regulatory-information/reach/ges-library

Other combinations of operational conditions may also be safe. Please contact Oxea in case your local operational conditions differ from the ones described below and you are unsure if they are also safe

Operational conditions and risk management measures
Wear suitable gloves tested to EN 374 for activities, where direct contact with substance is possible. Wear suitable eye protection, where direct contact (e.g. splashes) with substance is possible.

Exposure scenario identification
SAFETY DATA SHEET

Isononanoic acid
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Version / Revision 4.01

Number of the ES 1

Short title of the exposure scenario
Industrial use resulting in manufacture of another substance (use of intermediates)

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)

Process categories [PROC]
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 categories [ERC]
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

Further explanations
Industrial use

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 6a

Further specification
SpERC ESVOC 6.1a.v1 (ESVOC 2)
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assessmart tool used: Chesar 1.1.3

Amounts used
Daily amount per site: 3 to
Annual amount per site: 500 to
Fraction of Regional tonnage used locally: 1

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0 %
Release fraction to wastewater from process: 0.3 %
Release fraction to soil from process: 0.1%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 1</td>
<td></td>
</tr>
</tbody>
</table>

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 2</td>
<td></td>
</tr>
</tbody>
</table>

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 3</td>
<td></td>
</tr>
</tbody>
</table>

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
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Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Number of the contributing scenario
5
Contributing exposure scenario controlling worker exposure for PROC 4

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 15 minutes

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

Number of the contributing scenario
6
Contributing exposure scenario controlling worker exposure for PROC 8a

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 99 % (dermal).

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

Number of the contributing scenario
7
Contributing exposure scenario controlling worker exposure for PROC 8b

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
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Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
8

Contributing exposure scenario controlling worker exposure for
PROC 15

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 90 % (dermal).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th></th>
<th>PEC values</th>
<th>RCR values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>PEC: 0.056 mg/l; RCR: 0.831</td>
<td></td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>PEC: 0.752 mg/kg dw; RCR: 0.832</td>
<td></td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>PEC: 0.006 mg/l; RCR: 0.831</td>
<td></td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>PEC: 0.075 mg/kg dw; RCR: 0.832</td>
<td></td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>PEC: 0.12 mg/kg dw; RCR: 0.851</td>
<td></td>
</tr>
<tr>
<td>Sewage Treatment Plant (Effluent)</td>
<td>PEC: 0.563 mg/l; RCR: 0.024</td>
<td></td>
</tr>
</tbody>
</table>

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d].

<table>
<thead>
<tr>
<th>Proc</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>2</td>
<td>3.956</td>
<td>0.274</td>
</tr>
<tr>
<td>3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>4</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>8a</td>
<td>1.319</td>
<td>0.014</td>
</tr>
<tr>
<td>8b</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>15</td>
<td>3.297</td>
<td>0.034</td>
</tr>
</tbody>
</table>

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.
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### Isononanoic acid

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<table>
<thead>
<tr>
<th>Procedure</th>
<th>RCR (inhal):</th>
<th>RCR (derm):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.009</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 2</td>
<td>0.565</td>
<td>0.137</td>
</tr>
<tr>
<td>Proc 3</td>
<td>0.471</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 4</td>
<td>0.565</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>0.188</td>
<td>0.007</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>0.283</td>
<td>0.007</td>
</tr>
<tr>
<td>Proc 15</td>
<td>0.471</td>
<td>0.017</td>
</tr>
</tbody>
</table>

### Number of the ES

2

**Short title of the exposure scenario**

**Formulation & (re)packing of substances and mixtures**

### List of use descriptors

#### Sector of uses [SU]

- SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
- SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

#### Process categories [PROC]

- PROC1: Use in closed process, no likelihood of exposure
- PROC2: Use in closed, continuous process with occasional controlled exposure
- PROC3: Use in closed batch process (synthesis or formulation)
- PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
- PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
- PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
- PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
- PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
- PROC14: Production of preparations or articles by tabletting, compression, extrusion, pellettisation
- PROC15: Use as laboratory reagent

#### Environmental release categories [ERC]

- ERC3: Formulation in materials

### Environmental release categories [ERC]

- ERC3: Formulation in materials

### Product characteristics

Refer to attached safety data sheets

### Processes and activities covered by the exposure scenario

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

### Further explanations

**Industrial use**

### Contributing Scenarios

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>Contributing exposure scenario controlling environmental exposure for ERC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### Further specification

- SpERC ESVOC 2.2.v1 (ESVOC 4),
assessment tool used: Chesar 1.1.3.

**Amounts used**
- Daily amount per site: 5 to 800
- Annual amount per site: 800 to 8000
- Fraction of Regional tonnage used locally: 1

**Environment factors not influenced by risk management**
- River flow rate: 18000 m³/d
- Local freshwater dilution factor: 10
- Local marine water dilution factor: 100

**Technical conditions and measures at process level (source) to prevent release**
- Release fraction to air from process: 0.25%
- Release fraction to wastewater from process: 0.2%
- Release fraction to soil from process: 0.01%

**Conditions and measures related to municipal sewage treatment plant**
- Size of municipal sewage system/ treatment plant (m³/d): 2000
- The minimum grade of elimination in the sewage plant is (%): 87.5

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>Contributing exposure scenario controlling worker exposure for PROC 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td>assessment tool used: Chesar 1.1.3</td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td>8 h (full shift)</td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td>Indoor and outdoor use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>Contributing exposure scenario controlling worker exposure for PROC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td>assessment tool used: Chesar 1.1.3</td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td>Indoor and outdoor use</td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
<td>Wear suitable gloves tested to EN374</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>Contributing exposure scenario controlling worker exposure for PROC 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td>assessment tool used: Chesar 1.1.3</td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td>8 h (full shift)</td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td>Indoor and outdoor use</td>
</tr>
</tbody>
</table>
Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

**Other given operational conditions affecting workers exposure**
Indoor and outdoor use

**Number of the contributing scenario**
**Contributing exposure scenario controlling worker exposure for PROC 4**

**Further specification**
assessment tool used: Chesar 1.1.3

**Product characteristics**
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**
Indoor and outdoor use

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

**Number of the contributing scenario**
**Contributing exposure scenario controlling worker exposure for PROC 5**

**Further specification**
assessment tool used: Chesar 1.1.3

**Product characteristics**
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**
Indoor and outdoor use

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

**Number of the contributing scenario**
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Further specification**
assessment tool used: Chesar 1.1.3

**Product characteristics**
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to 2 hands (960 cm²)

**Other given operational conditions affecting workers exposure**
Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative);
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99 % (dermal).

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

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 8b

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 9
Contributing exposure scenario controlling worker exposure for PROC 9

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 10
Contributing exposure scenario controlling worker exposure for PROC 14

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 11
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Contributing exposure scenario controlling worker exposure for PROC 15

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
8 h (full shift)
Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 90 % (dermal).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th>Environment</th>
<th>PEC (mg/l)</th>
<th>RCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.063</td>
<td>0.924</td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.835</td>
<td>0.924</td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.006</td>
<td>0.924</td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.083</td>
<td>0.924</td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.134</td>
<td>0.95</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>0.626</td>
<td>0.027</td>
</tr>
</tbody>
</table>

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d].

<table>
<thead>
<tr>
<th>Procedure</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 2</td>
<td>3.956</td>
<td>0.274</td>
</tr>
<tr>
<td>Proc 3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 4</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 5</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>1.319</td>
<td>0.014</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 9</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 14</td>
<td>1.978</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 15</td>
<td>3.297</td>
<td>0.034</td>
</tr>
</tbody>
</table>

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>RCR(inhal)</th>
<th>RCR(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.009</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 2</td>
<td>0.565</td>
<td>0.137</td>
</tr>
<tr>
<td>Proc 3</td>
<td>0.565</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 4</td>
<td>0.471</td>
<td>0.343</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Proc</th>
<th>RCR(inhal):</th>
<th>RCR(derm):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 5</td>
<td>0.471</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>0.188</td>
<td>0.007</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 9</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 14</td>
<td>0.283</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 15</td>
<td>0.471</td>
<td>0.017</td>
</tr>
</tbody>
</table>

**Number of the ES** 3

**Short title of the exposure scenario**

**Distribution of substance**

**List of use descriptors**

**Sector of uses [SU]**
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

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

**Environmental release categories [ERC]**
ERC1: Manufacture of substances

**Product characteristics**
Refer to attached safety data sheets

**Processes and activities covered by the exposure scenario**
Loading (including marine vessel/barge, railroad car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities.

**Further explanations**
Industrial use

**Contributing Scenarios**

**Number of the contributing scenario** 1

**Contributing exposure scenario controlling environmental exposure for ERC 1**

**Further specification**
SpERC ESVOC 1.1b.v1 (ESVOC 3), release factors for (Sp)ERC were modified, assessment tool used: Chesar 1.1.3.

**Amounts used**
Daily amount per site: 66.67 to
Annual amount per site: 20000 to
Regional use tonnage (tonnes/year) 66.67

**Environment factors not influenced by risk management**
River flow rate: 18000 m³/d Local freshwater dilution factor: 10 Local marine water dilution factor: 100

### Technical conditions and measures at process level (source) to prevent release

- Release fraction to air from process: 0.001%
- Release fraction to wastewater from process: 0.001%
- Release fraction to soil from process: 0.001%

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

- Size of municipal sewage system/ treatment plant (m³/d): 2000
- The minimum grade of elimination in the sewage plant is (%): 87.5

#### Number of the contributing scenario

<table>
<thead>
<tr>
<th>Contributing exposure scenario controlling worker exposure for PROC 1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment tool used: Chesar 1.1.3</td>
<td></td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td></td>
</tr>
<tr>
<td>8 h (full shift)</td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
<td></td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
<td></td>
</tr>
</tbody>
</table>

#### Number of the contributing scenario

<table>
<thead>
<tr>
<th>Contributing exposure scenario controlling worker exposure for PROC 2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment tool used: Chesar 1.1.3</td>
<td></td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
<td></td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
<td></td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Wear suitable gloves tested to EN374.</td>
<td></td>
</tr>
</tbody>
</table>

#### Number of the contributing scenario

<table>
<thead>
<tr>
<th>Contributing exposure scenario controlling worker exposure for PROC 3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Further specification</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment tool used: Chesar 1.1.3</td>
<td></td>
</tr>
<tr>
<td><strong>Product characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 1 hour</td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
<td></td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
<td></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
<td></td>
</tr>
<tr>
<td>Number of the contributing scenario</td>
<td>5</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 4</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**  
assessment tool used: Chesar 1.1.3

**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**  
Indoor and outdoor use

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

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 8a</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**  
assessment tool used: Chesar 1.1.3

**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to 2 hands (960 cm²)

**Other given operational conditions affecting workers exposure**  
Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**  
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 99 % (dermal).

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

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 8b</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**  
assessment tool used: Chesar 1.1.3

**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 4 hours

**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**  
Indoor and outdoor use

**Conditions and measures related to personal protection, hygiene and health evaluation**  
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).
PROCP 9

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
9

Contributing exposure scenario controlling worker exposure for PROC 15

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 90 % (dermal).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th>Environment</th>
<th>PEC</th>
<th>RCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.004  mg/l;</td>
<td>0.64</td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.058  mg/kg dw;</td>
<td>0.064</td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.0004 mg/l;</td>
<td>0.064</td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.006  mg/kg dw;</td>
<td>0.064</td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.009  mg/kg dw;</td>
<td>0.063</td>
</tr>
<tr>
<td>Sewage Treatment Plant (Effluent)</td>
<td>0.042 mg/l;</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 2</td>
<td>3.956</td>
<td>0.274</td>
</tr>
<tr>
<td>Proc 3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 4</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>1.319</td>
<td>0.014</td>
</tr>
</tbody>
</table>
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Proc 8b  
Proc 9  
Proc 15

EE(inhal): 1.978 ; EE(derm): 1.371
EE(inhal): 1.978 ; EE(derm): 1.371
EE(inhal): 3.297 ; EE(derm): 0.034

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio;
total RCR= RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for
short-term and long-term exposure. The RCR's given correspond in each case to the most conservative
calculated values.

Proc 1  
Proc 2  
Proc 3  
Proc 4  
Proc 8a  
Proc 8b  
Proc 9  
Proc 15

RCR(inhal): 0.009 ; RCR(derm): 0.171
RCR(inhal): 0.565 ; RCR(derm): 0.137
RCR(inhal): 0.565 ; RCR(derm): 0.171
RCR(inhal): 0.471 ; RCR(derm): 0.343
RCR(inhal): 0.188 ; RCR(derm): 0.007
RCR(inhal): 0.283 ; RCR(derm): 0.686
RCR(inhal): 0.283 ; RCR(derm): 0.686
RCR(inhal): 0.471 ; RCR(derm): 0.017

Number of the ES 4
Short title of the exposure scenario Functional Fluids

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

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

Environmental release categories [ERC]
ERC7: Industrial use of substances in closed systems

Product characteristics

Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment
including maintenance and related material transfers

Further explanations
Industrial use

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 7

Further specification
SpERC ESVOC 7.13a.v1 (ESVOC 31),
assessment tool used: Chesar 1.1.3.

Amounts used
Daily amount per site: 5 to
Annual amount per site: 100 to
Fraction of Regional tonnage used locally: 1

Environment factors not influenced by risk management
River flow rate: 18000 m³/d Local freshwater dilution factor: 10 Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.01 %
Release fraction to wastewater from process: 0.03 %
Release fraction to soil from process: 0.1%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 1

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Number of the contributing scenario 3
Contributing exposure scenario controlling worker exposure for PROC 2

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

Number of the contributing scenario 4
Contributing exposure scenario controlling worker exposure for PROC 3

Further specification
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assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)
Other given operational conditions affecting workers exposure
Indoor and outdoor use

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 4

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 15 minutes

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)
Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 8a

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)
Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 99 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 8b

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Covers percentage substance in the product up to 100 % (unless stated differently)
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Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
8
Contributing exposure scenario controlling worker exposure for PROC 9

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio
Fresh Water (Pelagic) PEC: 0.01 mg/l; RCR: 0.141
Fresh Water (Sediment) PEC: 0.128 mg/kg dw; RCR: 0.142
Marine Water (Pelagic) PEC: 0.001 mg/l; RCR: 0.141
Marine Water (Sediment) PEC: 0.013 mg/kg dw; RCR: 0.14
Agricultural Soil PEC: 0.021 mg/kg dw; RCR: 0.147
Sewage Treatment Plant (Effluent) PEC: 0.094 mg/l; RCR: 0.004

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1 EE(inhal): 0.066 ; EE(derm): 0.343
Proc 2 EE(inhal): 3.956 ; EE(derm): 0.274
Proc 3 EE(inhal): 3.956 ; EE(derm): 0.343
Proc 4 EE(inhal): 3.297 ; EE(derm): 0.686
Proc 8a EE(inhal): 1.319 ; EE(derm): 0.014
Proc 8b EE(inhal): 1.978 ; EE(derm): 1.371
Proc 9 EE(inhal): 1.978 ; EE(derm): 1.371

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative
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Calculated values.

<table>
<thead>
<tr>
<th>Process</th>
<th>RCR (inhal)</th>
<th>RCR (derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.009</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 2</td>
<td>0.565</td>
<td>0.137</td>
</tr>
<tr>
<td>Proc 3</td>
<td>0.565</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 4</td>
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<tr>
<td>Proc 8a</td>
<td>0.188</td>
<td>0.007</td>
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<td>Proc 8b</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 9</td>
<td>0.283</td>
<td>0.686</td>
</tr>
</tbody>
</table>

Number of the ES 5

Short title of the exposure scenario
Functional Fluids

List of use descriptors

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
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
PROC9: 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 categories [ERC]
ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers

Further explanations
Professional use

Contributing Scenarios

Number of the contributing scenario 1

Contributing exposure scenario controlling environmental exposure for ERC 9a ERC 9b

Further specification
SpERC ESVOC 9.13b.v1 (ESVOC 32), assessment tool used: Chesar 1.1.3.

Amounts used
daily wide dispersive use: 0.00006 to/d
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**Fraction of EU tonnage used in region:** 0.1  
**Fraction of Regional tonnage used locally:** 0.002  
**Amounts used (EU):** 100 to/a

### Environment factors not influenced by risk management

- **River flow rate:** 18000 m³/d  
- **Local freshwater dilution factor:** 10  
- **Local marine water dilution factor:** 100

### Technical conditions and measures at process level (source) to prevent release

- **Release fraction to air from process:** 5 %  
- **Release fraction to wastewater from process:** 2.5 %  
- **Release fraction to soil from process:** 2.5%

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

- **Size of municipal sewage system/ treatment plant (m³/d):** 2000  
- **The minimum grade of elimination in the sewage plant is (%):** 87.5

---

#### Number of the contributing scenario 2

**Contributing exposure scenario controlling worker exposure for PROC 1**

**Further specification**

- **assessment tool used:** Chesar 1.1.3

**Product characteristics**

- Liquid, vapour pressure < 0.5 kPa at STP

**Frequency and duration of use**

- 8 h (full shift)

**Human factors not influenced by risk management**

- Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

**Other given operational conditions affecting workers exposure**

- Indoor and outdoor use

---

#### Number of the contributing scenario 3

**Contributing exposure scenario controlling worker exposure for PROC 2**

**Further specification**

- **assessment tool used:** Chesar 1.1.3

**Product characteristics**

- Liquid, vapour pressure < 0.5 kPa at STP

**Frequency and duration of use**

- Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**

- Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**

- Indoor and outdoor use

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

- Wear suitable gloves tested to EN374.

---

#### Number of the contributing scenario 4

**Contributing exposure scenario controlling worker exposure for PROC 3**

**Further specification**

- **assessment tool used:** Chesar 1.1.3

**Product characteristics**

- Liquid, vapour pressure < 0.5 kPa at STP

**Frequency and duration of use**

- Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
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<table>
<thead>
<tr>
<th>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</th>
</tr>
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<tbody>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
</tr>
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| Number of the contributing scenario | 5 |
| Contributing exposure scenario controlling worker exposure for PROC 8a |

#### Further specification

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<td><strong>Product characteristics</strong></td>
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<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
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<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
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<tr>
<td><strong>Frequency and duration of use</strong></td>
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<tr>
<td>Avoid carrying out activities involving exposure for more than 1 hour</td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to 2 hands (960 cm²)</td>
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<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
</tr>
<tr>
<td>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 95 %).</td>
</tr>
</tbody>
</table>

| Number of the contributing scenario | 6 |
| Contributing exposure scenario controlling worker exposure for PROC 8b |

#### Further specification

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<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
</tr>
<tr>
<td>Wear respiratory protection (Efficiency: 90 %). Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.</td>
</tr>
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</table>

| Number of the contributing scenario | 7 |
| Contributing exposure scenario controlling worker exposure for PROC 9 |

#### Further specification

<table>
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</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
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<tr>
<td><strong>Frequency and duration of use</strong></td>
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<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
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<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
</tr>
<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
</tr>
<tr>
<td>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection</td>
</tr>
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</table>
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(Efficiency: 90 %).

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 20</td>
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</table>

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear respiratory protection (Efficiency: 90 %). Wear suitable gloves tested to EN374.

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio
Fresh Water (Pelagic) PEC: 0.00022  mg/l; RCR:  0.003
Fresh Water (Sediment) PEC: 0.0003  mg/kg dw; RCR: 0.003
Marine Water (Pelagic) PEC: 0.00003  mg/l; RCR: 0.003
Marine Water (Sediment) PEC: 0.00027  mg/kg dw; RCR: 0.003
Agricultural Soil PEC: 0.000038  mg/kg dw; RCR: 0.00027
Sewage Treatment Plant (Effluent) PEC: 0.000086  mg/l; RCR: 0.000004

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

| Proc 1 | EE(inhal): 0.066 ; EE(derm): 0.343 |
| Proc 2 | EE(inhal): 3.297 ; EE(derm): 0.274 |
| Proc 3 | EE(inhal): 3.956 ; EE(derm): 0.343 |
| Proc 8a | EE(inhal): 3.297 ; EE(derm): 0.686 |
| Proc 8b | EE(inhal): 3.956 ; EE(derm): 0.686 |
| Proc 9 | EE(inhal): 3.956 ; EE(derm): 0.686 |
| Proc 20 | EE(inhal): 1.978 ; EE(derm): 0.343 |

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio;
total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

| Proc 1 | RCR(inhal): 0.009 ; RCR(derm): 0.171 |
| Proc 2 | RCR(inhal): 0.471 ; RCR(derm): 0.137 |
| Proc 3 | RCR(inhal): 0.565 ; RCR(derm): 0.171 |
| Proc 8a | RCR(inhal): 0.471 ; RCR(derm): 0.343 |
| Proc 8b | RCR(inhal): 0.565 ; RCR(derm): 0.343 |
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Proc 9
RCR(inhal): 0.565 ; RCR(derm): 0.343
Proc 20
RCR(inhal): 0.283 ; RCR(derm): 0.171

Number of the ES 6

Short title of the exposure scenario lubricants

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
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)
PROC5: 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
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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 categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
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.

Further explanations
Industrial use

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 4

Further specification
SpERC ESVOC 4.6a.v1 (ESVOC 13), assessment tool used: Chesar 1.1.3.

Amounts used
Daily amount per site: 5 to
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Annual amount per site: 100 to
Fraction of Regional tonnage used locally: 1

Environment factors not influenced by risk management
River flow rate: 18000 m³/d Local freshwater dilution factor: 10 Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.003 %
Release fraction to wastewater from process: 0.03 %
Release fraction to soil from process: 0.1%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 1

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 2

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 3

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)
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#### Other given operational conditions affecting workers exposure

**Indoor and outdoor use**

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 5</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**

- assessment tool used: Chesar 1.1.3

**Product characteristics**

- Liquid, vapour pressure $< 0.5$ kPa at STP
- Covers percentage substance in the product up to 100% (unless stated differently)

**Frequency and duration of use**

- Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**

- Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**

- Indoor and outdoor use

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

- Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 7</td>
<td></td>
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</tbody>
</table>

**Further specification**

- assessment tool used: StoffenManager RiskOfDerm

**Product characteristics**

- Liquid, vapour pressure $< 0.5$ kPa at STP
- Covers percentage substance in the product up to 20%

**Amounts used**

- 0.5 L/min

**Frequency and duration of use**

- 8 h (full shift)

**Other given operational conditions affecting workers exposure**

- Indoor use
- Room volume 100 - 1000 m³

**Technical conditions and measures at process level (source) to prevent release**

- Worker is segregated from source

**Technical conditions and measures to control dispersion from source towards the worker**

- Direction of application: Downward, air flow direction: away from worker. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Distance from source: $> 1$ m².

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

- Clean equipment and the work area every day
- Segregate the activity away from other operations

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

- Inspect and clean equipment regularly. Wear suitable gloves tested to EN374.

<table>
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<tr>
<th>Number of the contributing scenario</th>
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</thead>
<tbody>
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<td>Contributing exposure scenario controlling worker exposure for PROC 8a</td>
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</table>

**Further specification**

- assessment tool used: Chesar 1.1.3

**Product characteristics**

- Liquid, vapour pressure $< 0.5$ kPa at STP
- Covers percentage substance in the product up to 100% (unless stated differently)

**Frequency and duration of use**


Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to 2 hands (960 cm²)

**Other given operational conditions affecting workers exposure**
Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 99 % (dermal).

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

### Contributing exposure scenario controlling worker exposure for PROC 8b

<table>
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<th>8</th>
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</thead>
<tbody>
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<tr>
<td><strong>Product characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
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</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
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<tr>
<td><strong>Other given operational conditions affecting workers exposure</strong></td>
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<tr>
<td>Indoor and outdoor use</td>
<td></td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).</td>
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### Contributing exposure scenario controlling worker exposure for PROC 9

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<td><strong>Product characteristics</strong></td>
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<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
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<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
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<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
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<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
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<tr>
<td>Indoor and outdoor use</td>
<td></td>
</tr>
<tr>
<td><strong>Conditions and measures related to personal protection, hygiene and health evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).</td>
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### Contributing exposure scenario controlling worker exposure for PROC 10

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</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 25 %</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency and duration of use</strong></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 4 hours</td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
</tr>
</tbody>
</table>
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Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 95 % (dermal).

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

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 13

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 17

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 25 %

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 95 % (dermal).

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

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th>Environment</th>
<th>PEC</th>
<th>RCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.01 mg/l</td>
<td>0.141</td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.128 mg/kg dw</td>
<td>0.142</td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.001 mg/l</td>
<td>0.141</td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.013 mg/kg dw</td>
<td>0.14</td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.02 mg/kg dw</td>
<td>0.142</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>0.094 mg/l</td>
<td>0.004</td>
</tr>
</tbody>
</table>
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(Effluent)

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

<table>
<thead>
<tr>
<th>Proc</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 2</td>
<td>3.956</td>
<td>0.274</td>
</tr>
<tr>
<td>Proc 3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 5</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 7</td>
<td>0.64</td>
<td>0.56</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>1.319</td>
<td>0.014</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 9</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 10</td>
<td>2.374</td>
<td>0.069</td>
</tr>
<tr>
<td>Proc 13</td>
<td>3.856</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 17</td>
<td>3.956</td>
<td>0.069</td>
</tr>
</tbody>
</table>

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

<table>
<thead>
<tr>
<th>Proc 1</th>
<th>RCR(inhal)</th>
<th>RCR(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 2</td>
<td>0.009</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 3</td>
<td>0.565</td>
<td>0.137</td>
</tr>
<tr>
<td>Proc 5</td>
<td>0.565</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 7</td>
<td>0.471</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>0.09</td>
<td>0.27</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>0.188</td>
<td>0.007</td>
</tr>
<tr>
<td>Proc 9</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 10</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 13</td>
<td>0.339</td>
<td>0.034</td>
</tr>
<tr>
<td>Proc 17</td>
<td>0.565</td>
<td>0.343</td>
</tr>
</tbody>
</table>

Number of the ES 7

Short title of the exposure scenario lubricants

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
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
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PROC11: Non industrial spraying
PROC13: Treatment of articles by dipping and pouring
PROC17: Lubrication at high energy conditions and in partly open process
PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

Environmental release categories [ERC]
ERC9a: Wide dispersive indoor use of substances in closed systems
ERC9b: Wide dispersive outdoor use of substances in closed systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
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.

Further explanations
Professional use

Contributing Scenarios

Number of the contributing scenario 1
Contribution exposure scenario controlling environmental exposure for ERC 9a ERC 9b

Further specification
SpERC ESVOC 9.6b.v1 (ESVOC 14),
assessment tool used: Chesar 1.1.3.

Amounts used
daily wide dispersive use: 0.00006 to/d
Fraction of EU tonnage used in region: 0.1
Fraction of Regional tonnage used locally: 0.002
Amounts used (EU): 100 to/a

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 1 %
Release fraction to wastewater from process: 1 %
Release fraction to soil from process: 1%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

Number of the contributing scenario 2
Contribution exposure scenario controlling worker exposure for PROC 1

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)
Other given operational conditions affecting workers exposure
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**Version / Revision** 4.01

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**Indoor and outdoor use**

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 2</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**
- Assessment tool used: Chesar 1.1.3

**Product characteristics**
- Liquid, vapour pressure < 0.5 kPa at STP
- Covers percentage substance in the product up to 100% (unless stated differently)

**Frequency and duration of use**
- Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**
- Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**
- Indoor and outdoor use

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

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**Indoor and outdoor use**

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 3</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**
- Assessment tool used: Chesar 1.1.3

**Product characteristics**
- Liquid, vapour pressure < 0.5 kPa at STP
- Covers percentage substance in the product up to 100% (unless stated differently)

**Frequency and duration of use**
- Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
- Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

**Other given operational conditions affecting workers exposure**
- Indoor and outdoor use

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**Indoor and outdoor use**

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 4</td>
<td></td>
</tr>
</tbody>
</table>

**Further specification**
- Assessment tool used: Chesar 1.1.3

**Product characteristics**
- Liquid, vapour pressure < 0.5 kPa at STP
- Covers percentage substance in the product up to 100% (unless stated differently)

**Frequency and duration of use**
- Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
- Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**
- Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**
- Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 80% (inhalative); 90% (dermal).

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

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**Indoor and outdoor use**

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for</td>
<td></td>
</tr>
</tbody>
</table>
### PROC 8a

**Further specification**  
Assessment tool used: Chesar 1.1.3  
**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 100% (unless stated differently)  
**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 1 hour  
**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to 2 hands (960 cm²)  
**Other given operational conditions affecting workers exposure**  
Indoor and outdoor use  
**Conditions and measures related to personal protection, hygiene and health evaluation**  
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90%).

#### Number of the contributing scenario  
7  
Contributing exposure scenario controlling worker exposure for PROC 8b

### PROC 8b

**Further specification**  
Assessment tool used: Chesar 1.1.3  
**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 100% (unless stated differently)  
**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 4 hours  
**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)  
**Other given operational conditions affecting workers exposure**  
Indoor and outdoor use  
**Conditions and measures related to personal protection, hygiene and health evaluation**  
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Wear respiratory protection (Efficiency: 90%).

#### Number of the contributing scenario  
8  
Contributing exposure scenario controlling worker exposure for PROC 10

### PROC 10

**Further specification**  
Assessment tool used: Chesar 1.1.3  
**Product characteristics**  
Liquid, vapour pressure < 0.5 kPa at STP  
Covers percentage substance in the product up to 5%  
**Frequency and duration of use**  
Avoid carrying out activities involving exposure for more than 4 hours  
**Human factors not influenced by risk management**  
Area potentially exposed: corresponds to 2 hands (960 cm²)  
**Other given operational conditions affecting workers exposure**  
Indoor and outdoor use  
**Conditions and measures related to personal protection, hygiene and health evaluation**  
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90%).

#### Number of the contributing scenario  
9  
Contributing exposure scenario controlling worker exposure for PROC 11
Further specification
assessment tool used: StoffenManager RiskOfDerm

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 20 %

Amounts used
500 mL/min

Frequency and duration of use
8 h (full shift)

Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³

Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Distance from source: > 1 m². air flow direction: away from worker. Direction of application: Downward.

Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day

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

Number of the contributing scenario
10
Contributing exposure scenario controlling worker exposure for PROC 13

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
11
Contributing exposure scenario controlling worker exposure for PROC 17

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 5 %

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).
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Number of the contributing scenario 12
Contributing exposure scenario controlling worker exposure for PROC 20

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio
Fresh Water (Pelagic) PEC: 0.0002 mg/l; RCR: 0.003
Fresh Water (Sediment) PEC: 0.003 mg/kg dw; RCR: 0.003
Marine Water (Pelagic) PEC: 0.00002 mg/l; RCR: 0.003
Marine Water (Sediment) PEC: 0.0003 mg/kg dw; RCR: 0.003
Agricultural Soil PEC: 0.00003 mg/kg dw; RCR: 0.0002
Sewage Treatment Plant (Effluent) PEC: 0.00003 mg/l; RCR: 0.000001

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1 EE(inhal): 0.066 ; EE(derm): 0.343
Proc 2 EE(inhal): 3.297 ; EE(derm): 0.274
Proc 3 EE(inhal): 3.956 ; EE(derm): 0.343
Proc 4 EE(inhal): 2.637 ; EE(derm): 0.137
Proc 8a EE(inhal): 3.297 ; EE(derm): 0.686
Proc 8b EE(inhal): 3.956 ; EE(derm): 0.686
Proc 10 EE(inhal): 1.978 ; EE(derm): 1.371
Proc 11 EE(inhal): 0.64 ; EE(derm): 0.56
Proc 13 EE(inhal): 3.956 ; EE(derm): 0.686
Proc 17 EE(inhal): 1.319 ; EE(derm): 1.371
Proc 20 EE(inhal): 1.978 ; EE(derm): 0.343

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1 RCR(inhal): 0.009 ; RCR(derm): 0.171
Proc 2 RCR(inhal): 0.471 ; RCR(derm): 0.137
Proc 3 RCR(inhal): 0.565 ; RCR(derm): 0.171
Number of the ES 8

Short title of the exposure scenario
Metal working fluids / rolling oils

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
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)
PROC5: 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
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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 categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Covers the use in formulated MWFs (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.

Further explanations
Industrial use

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 4

Further specification
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SpERC ESVOC 4.7a.v1 (ESVOC 18),
assessment tool used: Chesar 1.1.3.

Amounts used
Daily amount per site: 5 to
Annual amount per site: 100 to
Fraction of Regional tonnage used locally: 1

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.6 %
Release fraction to wastewater from process: 0.03 %
Release fraction to soil from process: 0%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 1 2

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 2 3

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

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

Number of the contributing scenario
Contributing exposure scenario controlling worker exposure for PROC 3 4

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
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Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 1 hour

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

**Other given operational conditions affecting workers exposure**
Indoor and outdoor use

### Number of the contributing scenario
**Contributing exposure scenario controlling worker exposure for PROC 5**

**Further specification**
assessment tool used: Chesar 1.1.3

**Product characteristics**
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 15 minutes

**Human factors not influenced by risk management**
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

**Other given operational conditions affecting workers exposure**
Indoor and outdoor use

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

### Number of the contributing scenario
**Contributing exposure scenario controlling worker exposure for PROC 7**

**Further specification**
assessment tool used: StoffenManager RiskOfDerm

**Product characteristics**
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 20 %

**Amounts used**
Use rate: 500 mL/min

**Frequency and duration of use**
Avoid carrying out activities involving exposure for more than 1 hour

**Other given operational conditions affecting workers exposure**
Indoor use

**Room volume 100 - 1000 m³**

**Technical conditions and measures at process level (source) to prevent release**
Worker is segregated from source

**Technical conditions and measures to control dispersion from source towards the worker**
Distance from source: < 1 m². Direction of application: Downward. air flow direction: away from worker. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

**Organisational measures to prevent /limit releases, dispersion and exposure**
Clean equipment and the work area every day

**Conditions and measures related to personal protection, hygiene and health evaluation**
Inspect and clean equipment regularly. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

### Number of the contributing scenario
**Contributing exposure scenario controlling worker exposure for PROC 8a**
Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 99 % (dermal).

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

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 8b

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 9
Contributing exposure scenario controlling worker exposure for PROC 9

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 10
Contributing exposure scenario controlling worker exposure for PROC 10

Further specification
assessment tool used: Chesar 1.1.3
SAFETY DATA SHEET

Isononanoic acid

10310

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 25 %

Frequency and duration of use
4 h (half shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 95 % (dermal).

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

Number of the contributing scenario
11
Contributing exposure scenario controlling worker exposure for PROC 13

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
12
Contributing exposure scenario controlling worker exposure for PROC 17

Further specification
assessment tool used: StoffenManager RiskOfDerm

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 20 %

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³

Technical conditions and measures at process level (source) to prevent release
Containment of source
Technical conditions and measures to control dispersion from source towards the worker
Distance from source: > 1 m². Worker in separate cabine without specific ventilation. Segregate the activity away from other operations. provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Inspect and clean equipment regularly.
Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th>Environment</th>
<th>PEC</th>
<th>RCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.01 mg/l</td>
<td>0.141</td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.128 mg/kg dw</td>
<td>0.142</td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.001 mg/l</td>
<td>0.141</td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.013 mg/kg dw</td>
<td>0.142</td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.02 mg/kg dw</td>
<td>0.143</td>
</tr>
<tr>
<td>Sewage Treatment Plant (Effluent)</td>
<td>0.094 mg/l</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Fresh Water (Pelagic)
PEC: 0.01 mg/l; RCR: 0.141
Fresh Water (Sediment)
PEC: 0.128 mg/kg dw; RCR: 0.142
Marine Water (Pelagic)
PEC: 0.001 mg/l; RCR: 0.141
Marine Water (Sediment)
PEC: 0.013 mg/kg dw; RCR: 0.142
Agricultural Soil
PEC: 0.02 mg/kg dw; RCR: 0.143
Sewage Treatment Plant (Effluent)
PEC: 0.094 mg/l; RCR: 0.004

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 2</td>
<td>3.956</td>
<td>0.274</td>
</tr>
<tr>
<td>Proc 3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 5</td>
<td>3.297</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 7</td>
<td>1.319</td>
<td>0.014</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 9</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 10</td>
<td>2.374</td>
<td>0.069</td>
</tr>
<tr>
<td>Proc 13</td>
<td>3.856</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 17</td>
<td>0.029</td>
<td>0.467</td>
</tr>
</tbody>
</table>

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR = RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR’s given correspond in each case to the most conservative calculated values.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>RCR(inhal)</th>
<th>RCR(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.009</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 2</td>
<td>0.565</td>
<td>0.137</td>
</tr>
<tr>
<td>Proc 3</td>
<td>0.565</td>
<td>0.171</td>
</tr>
<tr>
<td>Proc 5</td>
<td>0.471</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 7</td>
<td>0.09</td>
<td>0.32</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>0.188</td>
<td>0.007</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 9</td>
<td>0.283</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 10</td>
<td>0.339</td>
<td>0.034</td>
</tr>
<tr>
<td>Proc 13</td>
<td>0.565</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 17</td>
<td>0.004</td>
<td>0.234</td>
</tr>
</tbody>
</table>

Number of the ES 9
Short title of the exposure scenario
Metal working fluids / rolling oils

List of use descriptors
Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
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)
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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 categories [ERC]
ERC8a: Wide dispersive indoor use of processing aids in open systems
ERC8d: Wide dispersive outdoor use of processing aids in open systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Covers the use in formulated MWFs (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.

Further explanations
Professional use

<table>
<thead>
<tr>
<th>Contributing Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of the contributing scenario</td>
</tr>
<tr>
<td>Contributing exposure scenario controlling environmental exposure for ERC 8a ERC 8d</td>
</tr>
</tbody>
</table>

Further specification
SpERC ESVOC 8.7c.v1 (ESVOC 20), assessment tool used: Chesar 1.1.3.

Amounts used
daily wide dispersive use: 0.00005 to/d
Fraction of Regional tonnage used locally: 0.1
Fraction of EU tonnage used in region: 0.002
Amounts used (EU): 100 to/a

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.5 %
Release fraction to wastewater from process: 5 %
Release fraction to soil from process: 5%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5
SAFETY DATA SHEET

Isononanoic acid
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<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for</td>
<td>PROC 1</td>
<td>2</td>
</tr>
<tr>
<td>Further specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assessment tool used: Chesar 1.1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 h (full shift)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other given operational conditions affecting workers exposure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
<td></td>
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</tbody>
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<tr>
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<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for</td>
<td>PROC 2</td>
<td>3</td>
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<tr>
<td>Further specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assessment tool used: Chesar 1.1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product characteristics</td>
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<td></td>
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<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
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<td></td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 15 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 2 hands (480 cm²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other given operational conditions affecting workers exposure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor and outdoor use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditions and measures related to personal protection, hygiene and health evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wear suitable gloves tested to EN374</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Number of the contributing scenario</th>
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</tr>
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<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for</td>
<td>PROC 3</td>
<td>4</td>
</tr>
<tr>
<td>Further specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assessment tool used: Chesar 1.1.3</td>
<td></td>
<td></td>
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<tr>
<td>Product characteristics</td>
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</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency and duration of use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoid carrying out activities involving exposure for more than 1 hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Human factors not influenced by risk management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area potentially exposed: corresponds to palm of 1 hand (240 cm²)</td>
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<td></td>
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<tr>
<td>Indoor and outdoor use</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for</td>
<td>PROC 5</td>
<td>5</td>
</tr>
<tr>
<td>Further specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assessment tool used: Chesar 1.1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid, vapour pressure &lt; 0.5 kPa at STP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covers percentage substance in the product up to 100 % (unless stated differently)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Isononanoic acid
10310

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure

Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 99.5 % (dermal).

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

Number of the contributing scenario 6
Contributing exposure scenario controlling worker exposure for PROC 8a

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 1 hour

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 7
Contributing exposure scenario controlling worker exposure for PROC 8b

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 8
Contributing exposure scenario controlling worker exposure for PROC 10

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 5 %

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Frequency and duration of use
4 h (half shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
9
Contributing exposure scenario controlling worker exposure for PROC 11

Further specification
assessment tool used: StoffenManager RiskOfDerm

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 20 %

Amounts used
Use rate: 500 mL/min

Frequency and duration of use
8 h (full shift)

Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³

Technical conditions and measures at process level (source) to prevent release
Worker is segregated from source

Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Distance from source: > 1 m². Segregate the activity away from other operations. Direction of application: Downward. air flow direction: away from worker.

Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day

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

Number of the contributing scenario
10
Contributing exposure scenario controlling worker exposure for PROC 13

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 2 hands (480 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario
11
Contributing exposure scenario controlling worker exposure for PROC 17
Further specification
assessment tool used: StoffenManager RiskOfDerm

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 20 %

Frequency and duration of use
8 h (full shift)

Other given operational conditions affecting workers exposure
Indoor use
Room volume 100 - 1000 m³

Technical conditions and measures at process level (source) to prevent release
Containment of source
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Worker in separate cabine without specific ventilation.

Organisational measures to prevent /limit releases, dispersion and exposure
Clean equipment and the work area every day

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

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
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<th>RCR</th>
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<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.0002 mg/l</td>
<td>0.003</td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.003 mg/kg dw</td>
<td>0.003</td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.00002 mg/l</td>
<td>0.003</td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.0003 mg/kg dw</td>
<td>0.003</td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.00006 mg/kg dw</td>
<td>0.0004</td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>0.00017 mg/l</td>
<td>0.00007</td>
</tr>
</tbody>
</table>

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

<table>
<thead>
<tr>
<th>Process</th>
<th>EE(inhal)</th>
<th>EE(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.066</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 2</td>
<td>3.297</td>
<td>0.274</td>
</tr>
<tr>
<td>Proc 3</td>
<td>3.956</td>
<td>0.343</td>
</tr>
<tr>
<td>Proc 5</td>
<td>2.637</td>
<td>0.003</td>
</tr>
<tr>
<td>Proc 8a</td>
<td>3.297</td>
<td>0.688</td>
</tr>
<tr>
<td>Proc 8b</td>
<td>3.956</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 10</td>
<td>1.978</td>
<td>1.371</td>
</tr>
<tr>
<td>Proc 11</td>
<td>0.64</td>
<td>0.56</td>
</tr>
<tr>
<td>Proc 13</td>
<td>3.956</td>
<td>0.686</td>
</tr>
<tr>
<td>Proc 17</td>
<td>0.029</td>
<td>0.467</td>
</tr>
</tbody>
</table>

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio;
total RCR = RCR(inhal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

<table>
<thead>
<tr>
<th>Process</th>
<th>RCR(inhal)</th>
<th>RCR(derm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc 1</td>
<td>0.009</td>
<td>0.171</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Isononanoic acid
10310

Version / Revision 4.01

Proc 2  
RCR(inhal): 0.471 ; RCR(derm): 0.137
Proc 3  
RCR(inhal): 0.565 ; RCR(derm): 0.171
Proc 5  
RCR(inhal): 0.377 ; RCR(derm): 0.002
Proc 8a  
RCR(inhal): 0.471 ; RCR(derm): 0.343
Proc 8b  
RCR(inhal): 0.565 ; RCR(derm): 0.343
Proc 10  
RCR(inhal): 0.283 ; RCR(derm): 0.686
Proc 11  
RCR(inhal): 0.09 ; RCR(derm): 0.27
Proc 13  
RCR(inhal): 0.565 ; RCR(derm): 0.343
Proc 17  
RCR(inhal): 0.004 ; RCR(derm): 0.234

Number of the ES 10

Short title of the exposure scenario
Use in laboratories

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]
PROC10: Roller application or brushing
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use of the substance within laboratory settings, including material transfers and equipment cleaning

Further explanations
Industrial use

Contributing Scenarios

Number of the contributing scenario 1
Contributing exposure scenario controlling environmental exposure for ERC 4

Further specification
assessment tool used: Chesar 1.1.3.

Amounts used
Daily amount per site: 0.005 to
Annual amount per site: 0.1 to
Fraction of Regional tonnage used locally: 1

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 2.5 %
Release fraction to wastewater from process: 2 %
Release fraction to soil from process: 0.01%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 10</td>
<td></td>
</tr>
</tbody>
</table>

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 25 %

Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 95 % (dermal).

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

<table>
<thead>
<tr>
<th>Number of the contributing scenario</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing exposure scenario controlling worker exposure for PROC 15</td>
<td></td>
</tr>
</tbody>
</table>

Further specification
assessment tool used: Chesar 1.1.3

Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)

Frequency and duration of use
8 h (full shift)

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor use

Technical conditions and measures to control dispersion from source towards the worker
Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 90 % (dermal).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

<table>
<thead>
<tr>
<th>Environment</th>
<th>PEC</th>
<th>RCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water (Pelagic)</td>
<td>0.0008 mg/l; RCR: 0.012</td>
<td></td>
</tr>
<tr>
<td>Fresh Water (Sediment)</td>
<td>0.011 mg/kg dw; RCR: 0.012</td>
<td></td>
</tr>
<tr>
<td>Marine Water (Pelagic)</td>
<td>0.00008 mg/l; RCR: 0.012</td>
<td></td>
</tr>
<tr>
<td>Marine Water (Sediment)</td>
<td>0.001 mg/kg dw; RCR: 0.012</td>
<td></td>
</tr>
<tr>
<td>Agricultural Soil</td>
<td>0.001 mg/kg dw; RCR: 0.01</td>
<td></td>
</tr>
<tr>
<td>Sewage Treatment Plant</td>
<td>0.006 mg/l; RCR: 0.00027</td>
<td></td>
</tr>
</tbody>
</table>
Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. The RMMs described above suffice to control risks for both local and systemic effects. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios.

Proc 10
EE(inhal): 2.374 ; EE(derm): 0.069
Proc 15
EE(inhal): 3.297 ; EE(derm): 0.034

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 10
RCR(inhal): 0.339 ; RCR(derm): 0.034
Proc 15
RCR(inhal): 0.471 ; RCR(derm): 0.017

Number of the ES  11

Use in laboratories

List of use descriptors

Sector of uses [SU]
SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]
PROC10: Roller application or brushing
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC8a: Wide dispersive indoor use of processing aids in open systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use of small quantities within laboratory settings, including material transfers and equipment cleaning

Further explanations

Contributing Scenarios

Number of the contributing scenario  1

Contributing exposure scenario controlling environmental exposure for ERC 8a

Further specification
SpERC ESVOC 8.17.v1 (ESVOC 39),
Isononanoic acid
10310

assesssment tool used: Chesar 1.1.3.

Amounts used
daily wide dispersive use: 0.000006 to/d
Fraction of Regional tonnage used locally: 0.002
Fraction of EU tonnage used in region: 0.1
Amounts used (EU): 10 to/a

Environment factors not influenced by risk management
River flow rate: 18000 m³/d
Local freshwater dilution factor: 10
Local marine water dilution factor: 100

Other given operational conditions affecting environmental exposure
Indoor use

Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 50 %
Release fraction to wastewater from process: 50 %
Release fraction to soil from process: 0%

Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m³/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.5

Number of the contributing scenario 2
Contributing exposure scenario controlling worker exposure for PROC 10

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 5 %
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to 2 hands (960 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 3
Contributing exposure scenario controlling worker exposure for PROC 15

Further specification
assessment tool used: Chesar 1.1.3
Product characteristics
Liquid, vapour pressure < 0.5 kPa at STP
Covers percentage substance in the product up to 100 % (unless stated differently)
Frequency and duration of use
Avoid carrying out activities involving exposure for more than 4 hours

Human factors not influenced by risk management
Area potentially exposed: corresponds to palm of 1 hand (240 cm²)

Other given operational conditions affecting workers exposure
Indoor and outdoor use

Conditions and measures related to personal protection, hygiene and health evaluation
Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source
SAFETY DATA SHEET

Isononanoic acid
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Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio
Fresh Water (Pelagic) PEC: 0.0002 mg/l; RCR: 0.003
Fresh Water (Sediment) PEC: 0.003 mg/kg dw; RCR: 0.003
Marine Water (Pelagic) PEC: 0.00002 mg/l; RCR: 0.003
Marine Water (Sediment) PEC: 0.0003 mg/kg dw; RCR: 0.003
Agricultural Soil PEC: 0.0006 mg/kg dw; RCR: 0.0004
Sewage Treatment Plant (Effluent) PEC: 0.0002 mg/l; RCR: 0.000008

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inal): Estimated inhalative long-term exposure [mg/m³]; EE(derm): Estimated dermal long-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 10
EE(inal): 1.978 ; EE(derm): 1.371
Proc 15
EE(inal): 1.978 ; EE(derm): 0.343

Risk characterisation
RCR(inal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR = RCR(inal) + RCR(derm). Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 10
RCR(inal): 0.283 ; RCR(derm): 0.686
Proc 15
RCR(inal): 0.283 ; RCR(derm): 0.171