SAFETY DATA SHEET

Orfom® MC8 Collector


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

1.1

Product information

Product Name: Orfom® MC8 Collector
Material: 1121327, 1122323, 1121613, 1121612, 1121601, 1121600

EC-No. Registration number

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No. EC-No. Index No.</th>
<th>Legal Entity Registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>25103-58-6 246-619-1</td>
<td>Chevron Phillips Chemicals International NV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01-2119486132-42-0002</td>
</tr>
<tr>
<td>tert-Dodecanethiol</td>
<td>25103-58-6 246-619-1</td>
<td>Chevron Phillips Chemical Company LP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01-2119486132-42-0005</td>
</tr>
</tbody>
</table>

1.2

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

Relevant Identified Uses: Use in mining – industrial

1.3

Details of the supplier of the safety data sheet

Company: Chevron Phillips Chemical Company LP
10001 Six Pines Drive
The Woodlands, TX 77380

Local: Chevron Phillips Chemicals International N.V.
Airport Plaza (Stockholm Building)
Leonardo Da Vincilaan 19
1831 Diegem
Belgium

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

SDS Number:100000103242
1.4 Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)

Transport:
CHEMTREC 800.424.9300 or 703.527.3887 (int'l)
Asia: CHEMWATCH (+612 9186 1132) China: 0532 8388 9090
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
Mexico CHEMTREC 01-800-681-9531 (24 hours)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600
Argentina: +(54)-1159839431

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

SECTION 2: Hazards identification

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

Skin irritation, Category 2
H315: Causes skin irritation.

Eye irritation, Category 2
H319: Causes serious eye irritation.

Skin sensitization, Category 1
H317: May cause an allergic skin reaction.

Long-term (chronic) aquatic hazard, Category 4
H413: May cause long lasting harmful effects to aquatic life.

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

Hazard pictograms:

Signal Word: Warning

Hazard Statements:
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H413 May cause long lasting harmful effects to aquatic life.

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

Response:
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
Hazardous ingredients which must be listed on the label:

- 25103-58-6 tert-Dodecanethiol

**SECTION 3: Composition/information on ingredients**

3.1 - 3.2 Substance or Mixture

### Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration [wt%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>25103-58-6</td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1B; H317 Aquatic Chronic 4; H413</td>
<td>91 - 97</td>
</tr>
<tr>
<td></td>
<td>246-619-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pine Oil</td>
<td>8002-09-3</td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317 Aquatic Chronic 3; H412</td>
<td>3 - 9</td>
</tr>
</tbody>
</table>

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

**SECTION 4: First aid measures**

4.1 Description of first-aid measures

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

**If inhaled**: If unconscious, place in recovery position and seek medical advice. If symptoms persist, call a physician.

**In case of skin contact**: If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.

**In case of eye contact**: Immediately flush eye(s) with plenty of water. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

**If swallowed**: Keep respiratory tract clear. Do NOT induce vomiting. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.
### SECTION 5: Firefighting measures

<table>
<thead>
<tr>
<th>5.1 Flash point</th>
<th>: 83 °C (181 °F)</th>
</tr>
</thead>
</table>

**Extinguishing media**

<table>
<thead>
<tr>
<th>Suitable extinguishing media</th>
<th>Carbon dioxide (CO2).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsuitable extinguishing media</td>
<td>High volume water jet.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.2 Special hazards arising from the substance or mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific hazards during firefighting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.3 Advice for firefighters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special protective equipment for fire-fighters</td>
</tr>
</tbody>
</table>

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

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

### SECTION 6: Accidental release measures

<table>
<thead>
<tr>
<th>6.1 Personal precautions, protective equipment and emergency procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal precautions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.2 Environmental precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental precautions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.3 Methods and materials for containment and cleaning up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods for cleaning up</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.4 Reference to other sections</th>
</tr>
</thead>
</table>

SDS Number:100000103242 4/24
SAFETY DATA SHEET

Orfom® MC8 Collector

Version 1.0

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

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling  Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

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

7.2 Conditions for safe storage, including any incompatibilities

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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Chevron Phillips Chemical Company LP

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

8.2 Exposure controls

Engineering measures

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

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

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

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

Skin and body protection: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate: Flame retardant protective clothing. Remove and wash contaminated clothing before re-use. Skin should be washed after contact. Footwear protecting against chemicals.

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

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

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance
Form: Liquid
Physical state: Liquid
Color: Colorless
Odor: pine

Safety data
Flash point: 83 °C (181 °F)
Boiling point/boiling range: 193 °C (379 °F)
Density: 0.879 g/cm³
at 25 °C (77 °F)
Viscosity, kinematic : 9.38 cSt

SECTION 10: Stability and reactivity

10.1 Reactivity : Stable under recommended storage conditions.

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

10.3 Possibility of hazardous reactions

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

Hazardous reactions: Vapors may form explosive mixture with air.

10.4 Conditions to avoid : Heat, flames and sparks.

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

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

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity
tert-Dodecanethiol : LD50: > 2.000 mg/kg
Species: Rat
Sex: female
Method: OECD Test Guideline 423

Pine Oil : LD50: 2.700 mg/kg
Species: Rat
Sex: male and female
Method: OPPTS 870.1100

Acute inhalation toxicity
tert-Dodecanethiol : LC50: > 1.97 mg/l
Exposure time: 4 h
Species: Rat
Sex: male and female
Method: OECD Test Guideline 403
Information given is based on data obtained from similar substances.

Pine Oil
LC50: > 20 mg/l
Exposure time: 4 h
Species: Rat
Test atmosphere: dust/mist
Method: OPPTS 870.1300

Acute dermal toxicity
tert-Dodecanethiol: LD50: > 2.000 mg/kg
Species: Rat
Sex: male
Method: OECD Test Guideline 402
Information given is based on data obtained from similar substances.

Pine Oil
LD50: > 5.000 mg/kg
Species: Rat
Method: OPPTS 870.1200

Acute toxicity (other routes of administration)
Pine Oil:

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Skin irritation: Skin irritation

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Eye irritation: Eye irritation.

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Sensitization: Causes sensitization.

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

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

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

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

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

Species: Rat, male  
Sex: male  
Application Route: Inhalation  
Dose: 5, 25, 100 ppm  
Exposure time: 90 d
Number of exposures: 6h/d, 5d/wk  
NOEL: 25 ppm  
Method: OECD Test Guideline 413

Species: Rat, female  
Sex: female  
Application Route: Inhalation  
Dose: 5, 25, 100 ppm  
Exposure time: 90 d  
Number of exposures: 6h/d, 5d/wk  
NOEL: 25 ppm  
Method: OECD Test Guideline 413

Species: Rat, male and female  
Sex: male and female  
Application Route: Dermal  
Dose: 50, 113, 226 mg/kg/d  
Exposure time: 13 wk  
Number of exposures: 5 d/wk  
NOEL: > 226 mg/kg

Genotoxicity in vitro

**tert-Dodecanethiol**  
Test Type: Ames test  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: negative

Test Type: Mouse lymphoma assay  
Metabolic activation: with and without metabolic activation  
Method: OECD Guideline 476  
Result: negative

Test Type: Sister Chromatid Exchange Assay  
Metabolic activation: with and without metabolic activation  
Method: OECD Guideline 479  
Result: negative

Test Type: Chromosome aberration test in vitro  
Metabolic activation: with and without metabolic activation  
Method: OECD Guideline 473  
Result: Ambiguous

Genotoxicity in vivo

**tert-Dodecanethiol**  
Test Type: In vivo micronucleus test  
Species: Mouse  
Route of Application: Oral  
Dose: 1250, 2500, 5000 mg/kg/bw  
Method: Mutagenicity (micronucleus test)  
Result: negative  
Remarks: Information given is based on data obtained from similar substances.

Reproductive toxicity

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

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

Developmental Toxicity

tert-Dodecanethiol

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

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

Pine Oil

Species: Rat
Application Route: oral gavage
Dose: 50, 600, 1200 mg/kg/d
Exposure time: GD 6 - 15
Number of exposures: Daily
NOAEL Teratogenicity: 50 mg/kg
NOAEL Maternal: 50 mg/kg

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Aspiration toxicity: May be harmful if swallowed and enters airways.

CMR effects

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

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**Further information:** Solvents may degrease the skin.

---

**SECTION 12: Ecological information**

12.1 Toxicy

**Ecotoxicity effects**

**Toxicity to fish**

<table>
<thead>
<tr>
<th>tert-Dodecanethiol</th>
<th>LL50: &gt; 100 mg/l</th>
<th>Exposure time: 96 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species: Danio rerio (Zebra Fish)</td>
<td>static test Method: OECD Test Guideline 203</td>
<td></td>
</tr>
<tr>
<td>No toxicity at the limit of solubility.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pine Oil</th>
<th>18.4 mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time: 96 h</td>
<td></td>
</tr>
<tr>
<td>Species: Oncorhynchus mykiss (rainbow trout)</td>
<td></td>
</tr>
<tr>
<td>Flow-through test Method: OPPTS 850.1075</td>
<td></td>
</tr>
</tbody>
</table>

**Toxicity to daphnia and other aquatic invertebrates**

<table>
<thead>
<tr>
<th>tert-Dodecanethiol</th>
<th>EC50: &gt; 0.056 mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time: 48 h</td>
<td></td>
</tr>
<tr>
<td>Species: Daphnia magna (Water flea)</td>
<td></td>
</tr>
<tr>
<td>semi-static test Method: OECD Test Guideline 202</td>
<td></td>
</tr>
<tr>
<td>No toxicity at the limit of solubility.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pine Oil</th>
<th>24.5 mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time: 48 h</td>
<td></td>
</tr>
<tr>
<td>Species: Daphnia magna (Water flea)</td>
<td></td>
</tr>
<tr>
<td>Flow-through test Method: OPPTS 850.1010</td>
<td></td>
</tr>
</tbody>
</table>

**Toxicity to bacteria**

<table>
<thead>
<tr>
<th>tert-Dodecanethiol</th>
<th>NOEC: 8.6 mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time: 3 h</td>
<td></td>
</tr>
<tr>
<td>Growth rate</td>
<td></td>
</tr>
<tr>
<td>Respiration inhibition</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 209</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOEC: &gt; 10 mg/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time: 3 h</td>
</tr>
<tr>
<td>Growth rate</td>
</tr>
<tr>
<td>Respiration inhibition</td>
</tr>
<tr>
<td>Method: OECD Test Guideline 209</td>
</tr>
</tbody>
</table>

---

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

12.2 Persistence and degradability

Biodegradability

<table>
<thead>
<tr>
<th>Component</th>
<th>Result</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>Not readily biodegradable. 0%</td>
<td>OECD Test Guideline 301D</td>
</tr>
<tr>
<td>Pine Oil</td>
<td>This material is expected to be readily biodegradable.</td>
<td>OECD Test Guideline 305</td>
</tr>
</tbody>
</table>

12.3 Bioaccumulative potential

Elimination information (persistence and degradability)

<table>
<thead>
<tr>
<th>Component</th>
<th>Species</th>
<th>Bioconcentration factor (BCF)</th>
<th>Method</th>
<th>Biomagnification factor</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>Danio rerio (zebra fish)</td>
<td>&gt; 500 - &lt; 1.950</td>
<td>OECD Test Guideline 305</td>
<td>&lt;1</td>
<td>The product may be accumulated in organisms.</td>
</tr>
<tr>
<td>Pine Oil</td>
<td>No data available</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

12.4 Mobility in soil

<table>
<thead>
<tr>
<th>Component</th>
<th>Mobility</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Oil</td>
<td>No data available</td>
<td>-</td>
</tr>
</tbody>
</table>

12.5 Results of PBT and vPvB assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Results of PBT assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Oil</td>
<td>Harmful to aquatic life.</td>
</tr>
</tbody>
</table>

12.6 Other adverse effects

Ecotoxicology Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Additional ecological information</th>
<th>Short-term (acute) aquatic hazard</th>
<th>Long-term (chronic) aquatic hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>tert-Dodecanethiol</td>
<td>No toxicity at the limit of solubility.</td>
<td>No toxicity at the limit of solubility.</td>
<td></td>
</tr>
<tr>
<td>Pine Oil</td>
<td>Harmful to aquatic life.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

Orfom® MC8 Collector

Version 1.0
Revision Date 2019-01-17

tert-Dodecanethiol : May cause long lasting harmful effects to aquatic life.
Pine Oil : Harmful to aquatic life with long lasting effects.

Toxicity Data on Soil
tert-Dodecanethiol : Adsorbs on soil.

SECTION 13: Disposal considerations

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

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

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

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

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

SECTION 14: Transport information

14.1 - 14.7 Transport information
The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

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

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
UN1268, PETROLEUM DISTILLATES, N.O.S., COMBUSTIBLE LIQUID, III

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (PINE OIL), 9, III, (83 °C), MARINE POLLUTANT, (PINE OIL)

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
UN3334, AVIATION REGULATED LIQUID, N.O.S., (TERT-DODECANETHIOL), 9, III

SDS Number:100000103242 14/24
ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

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

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

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

SECTION 15: Regulatory information

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

15.2 Chemical Safety Assessment
Components: tert-dodecanethiol A Chemical Safety Assessment 246-619-1 has been carried out for this substance.

Notification status
Europe REACH: A substance or substances in this product is not registered or notified to be registered. Importation or manufacture of this product is still permitted provided that it does not exceed the REACH minimum threshold quantity of the non-regulated substances.
United States of America (USA) TSCA: On TSCA Inventory
Switzerland CH INV: On the inventory, or in compliance with the inventory
Canada DSL: All components of this product are on the Canadian DSL
Australia AICS: On the inventory, or in compliance with the inventory
New Zealand NZIoC: On the inventory, or in compliance with the inventory
Japan ENCS: On the inventory, or in compliance with the inventory
Korea KECI: On the inventory, or in compliance with the inventory
Philippines PICCS: On the inventory, or in compliance with the inventory
China IECSC: On the inventory, or in compliance with the inventory
SECTION 16: Other information

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

Further information

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

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

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

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

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

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

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H412 Harmful to aquatic life with long lasting effects.
H413 May cause long lasting harmful effects to aquatic life.
**Annex**

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

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

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

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

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

**Environment factors not influenced by risk management**

- **Flow rate:** 18,000 m³/d

**Other given operational conditions affecting environmental exposure**

- **Local release to the environment**
  - Emission or Release Factor: Air: 0 %
  - Emission or Release Factor: Water: 0,1 %
  - Emission or Release Factor: Soil: 0,025 %
- **Local release rate:**
  - Air: 0 kg/day
  - Water: 1 kg/day

**Technical conditions and measures / Organizational measures**

- **Remarks:** Not applicable

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

- **Type of Sewage Treatment Plant:** Municipal sewage treatment plant
- **Flow rate of sewage treatment plant effluent:** 2,000 m³/d
- **Effectiveness (of a measure):** 96 %

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

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

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

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

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

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

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

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

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

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

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

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

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

Conditions and measures related to personal protection, hygiene and health evaluation
- Eye Protection: Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- Respiratory Protection: No (Effectiveness: 0 %)
- Dermal Protection: Yes, Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. (Effectiveness: 80 %)
### 2.2 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

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

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

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

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

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

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

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

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

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

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

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

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

#### Conditions and measures related to personal protection, hygiene and health evaluation
- **Eye Protection:** Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact
- **Respiratory Protection:** No (Effectiveness: 0 %)
Orfom® MC8 Collector

Version 1.0

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

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

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

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

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>Frequency and duration of use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure duration</td>
<td>&lt; 1 h</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Technical conditions and measures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-closed process with occasional controlled exposure</td>
<td></td>
</tr>
<tr>
<td>Local exhaust ventilation- inhalation;</td>
<td>No (Effectiveness: 0 %)</td>
</tr>
</tbody>
</table>
Conditions and measures related to personal protection, hygiene and health evaluation
Eye Protection, Yes, chemically resistant face shield, goggles, or safety glasses with side shields when there is potential for direct contact

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

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

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

Frequency and duration of use
Exposure duration : < 1 h

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

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

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

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

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

3. Exposure estimation and reference to its source

Environment

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

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)
## Workers/Consumers

<table>
<thead>
<tr>
<th>Contributing Scenario</th>
<th>Exposure Assessment Method</th>
<th>Specific conditions</th>
<th>Value type</th>
<th>Level of Exposure</th>
<th>Risk characterization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROC1</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,004 mg/m³</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,003 mg/kg/d</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>&lt; 0,01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC2</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,354 mg/m³</td>
<td>0,708</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,027 mg/kg/d</td>
<td>0,016</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,724</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC3</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,354 mg/m³</td>
<td>0,708</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,014 mg/kg/d</td>
<td>&lt; 0,01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,716</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC4</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,137 mg/kg/d</td>
<td>0,081</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,587</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8a</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,235 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,274 mg/kg/d</td>
<td>0,161</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,667</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC8b</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,274 mg/kg/d</td>
<td>0,161</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,667</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROC9</td>
<td>ECETOC TRA Modified</td>
<td>Worker – inhalation, long-term – systemic</td>
<td>0,253 mg/m³</td>
<td>0,506</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – dermal, long-term – systemic</td>
<td>0,137 mg/kg/d</td>
<td>0,081</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worker – long-term – systemic Combined routes</td>
<td>0,587</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROC1: Use in closed process, no likelihood of exposure

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

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

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

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

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

   Not applicable