



## Orfom® MC8 Collector

Version 1.1

Revision Date 2023-04-19

According to Regulation (EC) No. 1907/2006, Regulation (EC) No. 2020/878

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

#### 1.1 Product identifier

##### Product information

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

##### EC-No.Registration number

Chemical name	CAS-No. EC-No. Index No.	Legal Entity Registration number
tert-Dodecanethiol	25103-58-6 246-619-1	Chevron Phillips Chemicals International NV 01-2119486132-42-0002
tert-Dodecanethiol	25103-58-6 246-619-1	Chevron Phillips Chemical Company LP 01-2119486132-42-0005

#### 1.2

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

Relevant Identified Uses : Use in mining – industrial  
 Supported

#### 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  
 Responsible Party: Product Safety Group  
 Email:sds@cpchem.com

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**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

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

EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Austria: VIZ +43 1 406 43 43 (24 hours/day, 7 days/week)

Belgium: 070 245 245 (24 hours/day, 7 days/week)

Bulgaria: +359 2 9154 233

Croatia: +3851 2348 342 (24 hours/day, 7 days/week)

Cyprus: 1401

Czech Republic: Toxicological Information Center +420 224 919 293, +420 224 915 402

Denmark: Danish Poison Center (Giftlinjen): +45 8212 1212

Estonia: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Finland: 0800 147 111 09 471 977 (24 hours/day)

France: ORFILA number (INRS): + 33 (0) 1 45 42 59 59 (24 hours/day, 7 days/week)

Germany: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Greece: (0030) 2107793777 (24 hours/day, 7 days/week)

Hungary: +36-80-201-199 (24 hours/day, 7 days/week)

Iceland: 543 2222 (24 hours/day, 7 days/week)

Ireland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Italy: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Latvia: State Fire and Rescue Service, phone number: 112; Toxicology and Sepsis Clinic

Poisoning and Drug Information Center, Hipokrāta 2, Riga, Latvia, LV-1038, phone number +371 67042473. (24 hours.)

Liechtenstein: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Lithuania: +370 (85) 2362052

Luxembourg: (+352) 8002 5500 (24 hours/day, 7 days/week)

Malta: +356 2395 2000

The Netherlands: NVIC: +31 (0)88 755 8000

Norway: 22 59 13 00 (24 hours/day, 7 days/week)

Poland: BIG +32.14.584545 (phone) or +32.14583516 (telefax)

Portugal: CIAV phone number: +351 800 250 250

Romania: +40213183606

Slovakia: +421 2 5477 4166

Slovenia: Phone number: 112

Spain: National Emergency Telephone Number of Spanish Poison Centre: +34 91 562 04 20 (24 hours/day, 7 days/week)

Sweden: 112 – ask for Poisons Information

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.

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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  
H317  
H413

Causes skin irritation.

May cause an allergic skin reaction.

May cause long lasting harmful effects to aquatic life.

Precautionary Statements

: **Prevention:**

P261

Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.

P264

Wash skin thoroughly after handling.

P273

Avoid release to the environment.

P280

Wear protective gloves.

**Response:**

P333 + P313

If skin irritation or rash occurs: Get medical advice/ attention.

P362 + P364

Take off contaminated clothing and wash it before reuse.

Hazardous ingredients which must be listed on the label:

- 25103-58-6      tert-Dodecanethiol
- 8002-09-3      Pine Oil
- 848940-17-0      Thiol synthesis by-products

**2.3****Other hazards**Results of PBT and vPvB  
assessment

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

Endocrine disrupting  
properties

: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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**SECTION 3: Composition/information on ingredients****3.1 - 3.2****Substance or Mixture****Hazardous ingredients**

Chemical name	CAS-No. EC-No. Index No.	Classification (REGULATION (EC) No 1272/2008)	Concentration [wt%]	Specific Conc. Limits, M-factors and ATEs
tert-Dodecanethiol	25103-58-6 246-619-1	Skin Irrit. 2; H315 Skin Sens. 1B; H317 Aquatic Chronic 4; H413	91 - 97	
Pine Oil	8002-09-3	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317 Aquatic Chronic 3; H412	3 - 9	
Thiol synthesis by-products		Skin Irrit. 2; H315 Skin Sens. 1B; H317 Aquatic Chronic 4; H413	1 - 5	

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 : Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
- If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

**4.2 Most important symptoms and effects, both acute and delayed****Notes to physician**

Symptoms : No data available.

Risks : No data available.

**4.3 Indication of any immediate medical attention and special treatment needed**

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Treatment : No data available.

**SECTION 5: Firefighting measures**

5.1 Flash point : 83°C (181°F)

**Extinguishing media**Suitable extinguishing media : Carbon dioxide (CO<sub>2</sub>).

Unsuitable extinguishing media : High volume water jet.

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

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

**5.3****Advice for firefighters**

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.

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

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

**SECTION 6: Accidental release measures****6.1****Personal precautions, protective equipment and emergency procedures**

Personal precautions : Use personal protective equipment. Ensure adequate ventilation.

**6.2****Environmental precautions**

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

**6.3****Methods and materials for containment and cleaning up**

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

**6.4**

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**Reference to other sections**

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

**SECTION 7: Handling and storage****7.1****Precautions for safe handling  
Handling**

Advice on safe handling : Avoid formation of aerosol. Do not breathe vapors/dust. 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 a naked flame or any 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**

Components	Basis	Value	Control parameters	Note
tert-Dodecanethiol	Manufacturer	TWA	0,1 ppm,	

**8.2****Exposure controls  
Engineering measures**

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

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**Personal protective equipment**

- Respiratory protection : If ventilation or other engineering controls are not adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure, a supplied-air NIOSH approved respirator may be appropriate. If exposure to harmful levels of airborne material may occur, a NIOSH approved respirator that provides protection may be appropriate, such as:. A positive pressure, air-supplying respirator may be appropriate if there is potential for uncontrolled release, aerosolization, 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/cm<sup>3</sup>  
 at 25°C (77°F)

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Viscosity, kinematic : 9,38 cSt

**9.2****Other information**

Conductivity : No data available

**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** : 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 423Pine Oil : LD50: 2.700 mg/kg  
Species: Rat  
Sex: male and female  
Method: OPPTS 870.1100**Acute inhalation toxicity**

tert-Dodecanethiol : LC50: &gt; 1,97 mg/l



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Exposure time: 4 h  
 Species: Rat  
 Sex: male and female  
 Test atmosphere: vapor  
 Method: OECD Test Guideline 403  
 Information given is based on data obtained from similar substances.

Pine Oil

LC50: > 3,67 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: > 2.000 mg/kg  
 Species: Rat  
 Method: OPPTS 870.1200

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Skin irritation**

: Skin irritation  
 largely based on animal evidence.

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Eye irritation**

: May irritate eyes.

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Sensitization**

: Causes sensitization. largely based on animal evidence.

**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

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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: 50, 100, 200 mg/kg  
Exposure time: 10 wk  
Number of exposures: once daily  
NOEL: 200 mg/kg  
Method: OECD Guideline 422  
Target Organs: Kidney, Liver

Species: Rat, female  
Sex: female  
Application Route: oral gavage  
Dose: 50, 100, 200 mg/kg  
Exposure time: 8 - 9 wk  
Number of exposures: once daily  
NOEL: 200 mg/kg  
Method: OECD Guideline 422  
Target Organs: Liver

Species: Rat, male  
Sex: male  
Application Route: Inhalation  
Dose: 5, 25, 100 ppm  
Exposure time: 13 wk  
Number of exposures: 6h/d, 5d/wk  
NOEL: 25 ppm  
Method: OECD Test Guideline 413

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Species: Rat, female  
 Sex: female  
 Application Route: Inhalation  
 Dose: 5, 25, 100 ppm  
 Exposure time: 13 wk  
 Number of exposures: 6h/d, 5d/wk  
 NOEL: 25 ppm  
 Method: OECD Test Guideline 413

Pine Oil

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 Test Guideline 473  
 Result: negative

**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: 50, 100, 200 mg/kg/d  
 Exposure time: 10 wk  
 Number of exposures: Daily

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Method: OECD Guideline 422  
 NOAEL Parent: 200 mg/kg  
 Animal testing did not show any effects on fertility.

Species: Rat  
 Sex: female  
 Application Route: oral gavage  
 Dose: 50, 100, 200 mg/kg/d  
 Exposure time: 8 - 9 wk  
 Number of exposures: Daily  
 Method: OECD Guideline 422  
 NOAEL Parent: 200 mg/kg  
 NOAEL F1: 100 mg/kg  
 Animal testing did not show any effects on fertility.  
 Reduced fetal weight.

Species: Rat  
 Sex: male  
 Application Route: oral gavage  
 Dose: 25, 75, 200 mg/kg/d  
 Exposure time: 18 wk  
 Number of exposures: Daily  
 Method: OECD Test Guideline 443  
 NOAEL Parent: 200 mg/kg  
 NOAEL F1: 200 mg/kg  
 NOAEL F2: 200 mg/kg  
 Animal testing did not show any effects on fertility.

Species: Rat  
 Sex: female  
 Application Route: oral gavage  
 Dose: 25, 75, 200 mg/kg/d  
 Exposure time: 16 - 18 wk  
 Number of exposures: Daily  
 Method: OECD Test Guideline 443  
 NOAEL Parent: 200 mg/kg  
 NOAEL F1: 200 mg/kg  
 NOAEL F2: 200 mg/kg  
 Animal testing did not show any effects on fertility.  
 Reduced fetal weight.

**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:  $\geq 88.6$  ppm  
 No adverse effects expected

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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:  $\geq$  88.6 ppm  
 No adverse effects expected

Species: Rabbit  
 Application Route: oral gavage  
 Dose: 0, 50, 100, 200 mg/kg/d  
 Number of exposures: Daily  
 Test period: GD 6-28  
 Method: OECD Guideline 414  
 NOAEL Teratogenicity: 100 mg/kg  
 NOAEL Maternal: 100 mg/kg  
 Embryotoxic effects and adverse effects on the offspring were detected only at high maternally toxic doses

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

**11.2****Information on other hazards****Orfom® MC8 Collector  
Further information**Endocrine disrupting  
properties

: Solvents may degrease the skin.  
 : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

**SECTION 12: Ecological information****12.1****Toxicity****Ecotoxicity effects**

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**Toxicity to fish**

tert-Dodecanethiol : LL50: > 100 mg/l  
 Exposure time: 96 h  
 Species: Danio rerio (Zebra Fish)  
 static test Method: OECD Test Guideline 203  
 No toxicity at the limit of solubility.

Pine Oil 18,4 mg/l  
 Exposure time: 96 h  
 Species: Oncorhynchus mykiss (rainbow trout)  
 flow-through test Method: OPPTS 850.1075

**Toxicity to daphnia and other aquatic invertebrates**

tert-Dodecanethiol : EC50: > 0,056 mg/l  
 Exposure time: 48 h  
 Species: Daphnia magna (Water flea)  
 semi-static test Method: OECD Test Guideline 202  
 No toxicity at the limit of solubility.

Pine Oil 24,5 mg/l  
 Exposure time: 48 h  
 Species: Daphnia magna (Water flea)  
 flow-through test Method: OPPTS 850.1010

**Toxicity to bacteria**

tert-Dodecanethiol : NOEC: 8,6 mg/l  
 Exposure time: 3 h  
 Growth rate  
 Respiration inhibition  
 Method: OECD Test Guideline 209

NOEC: > 10 mg/l  
 Exposure time: 3 h  
 Growth rate  
 Respiration inhibition  
 Method: OECD Test Guideline 209

**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**

tert-Dodecanethiol : aerobic  
 Result: Not readily biodegradable.

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0 %  
 Testing period: 28 d  
 Method: OECD Test Guideline 301D

Pine Oil : This material is expected to be readily biodegradable.

**12.3****Bioaccumulative potential**

Elimination information (persistence and degradability)

Bioaccumulation

tert-Dodecanethiol : Species: Danio rerio (zebra fish)  
 Exposure time: 15 d  
 Bioconcentration factor (BCF): > 500 - < 1.950  
 Method: OECD Test Guideline 305  
 Biomagnification factor <1  
 The product may be accumulated in organisms.

Pine Oil : Accumulation in aquatic organisms is expected.

**12.4****Mobility in soil**

Mobility : No data available

**12.5****Results of PBT and vPvB assessment**

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

**12.6****Endocrine disrupting properties**

Endocrine disrupting properties : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

**12.7****Other adverse effects**

Additional ecological information : May cause long lasting harmful effects to aquatic life.

**12.8****Additional Information****Ecotoxicology Assessment**

Short-term (acute) aquatic hazard

tert-Dodecanethiol : No toxicity at the limit of solubility.

Pine Oil : Harmful to aquatic life.

Thiol synthesis by-products : No toxicity at the limit of solubility.

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Long-term (chronic) aquatic hazard  
 tert-Dodecanethiol : May cause long lasting harmful effects to aquatic life.

Pine Oil : Harmful to aquatic life with long lasting effects.

Thiol synthesis by-products : May cause long lasting harmful effects to aquatic life.

**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 PRODUCTS, N.O.S., 3, III

**IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)**

UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (PINE OIL), 9, III, (83 °C c.c.), MARINE POLLUTANT, (PINE OIL)

**IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)**

UN3334, AVIATION REGULATED LIQUID, N.O.S., (TERT – DODECANETHIOL), 9, III



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**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.

**Maritime transport in bulk according to IMO instruments**

**SECTION 15: Regulatory information****15.1****Safety, health and environmental regulations/legislation specific for the substance or mixture**  
**National legislation**

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

**15.2****Chemical Safety Assessment**

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

**Major Accident Hazard Legislation** : ZEU\_SEVES3 Update: Not applicable

**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.

Switzerland CH INV : Not in compliance with the inventory

United States of America (USA) TSCA : On or in compliance with the active portion of the TSCA inventory

Canada DSL : All components of this product are on the Canadian DSL

Australia AIIC : On the inventory, or in compliance with the inventory

New Zealand NZIoC : Not in compliance with the inventory

Japan ENCS : Not in compliance with the inventory

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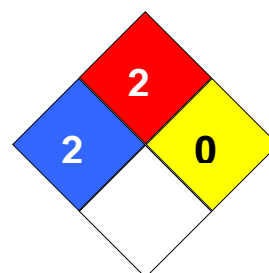
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Korea KECI	:	A substance(s) in this product was not registered, notified to be registered, or exempted from registration by CPChem according to K-REACH regulations. Importation or manufacture of this product is still permitted provided the Korean Importer of Record has themselves notified the substance or the exported amount does not exceed the minimum threshold quantity of the non-registered substance(s).
Philippines PICCS	:	On the inventory, or in compliance with the inventory
Taiwan TCSI	:	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**

ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AIIC	Australian Inventory of Industrial Chemicals	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration	PRNT	Presumed Not Toxic

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	Values		
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%	ATE	Acute toxicity estimate

**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.

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

Main User Groups	:	<b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of use	:	<b>SU2a:</b> Mining, (without offshore industries)
Process category	:	<b>PROC1:</b> Use in closed process, no likelihood of exposure <b>PROC2:</b> Use in closed, continuous process with occasional controlled exposure <b>PROC3:</b> Use in closed batch process (synthesis or formulation) <b>PROC4:</b> Use in batch and other process (synthesis) where opportunity for exposure arises <b>PROC8a:</b> Transfer of substance or mixture (charging/discharging) at non dedicated-facilities <b>PROC8b:</b> Transfer of substance or mixture (charging/discharging) at dedicated facilities <b>PROC9:</b> Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Environmental release category	:	<b>ERC4:</b> 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

Local release rate: 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**

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**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 cm<sup>2</sup>)

**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- inhalation:, 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 cm<sup>2</sup>)

**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- 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 %)

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**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 : <= 40 °C

**Frequency and duration of use**

Exposure duration : < 1 h

**Human factors not influenced by risk management**

Exposed skin area : One hand face only (240 cm<sup>2</sup>)

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
 Remarks : Good general ventilation (3-5 air changes per hour)

**Technical conditions and measures**

Closed batch 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 : <= 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 cm<sup>2</sup>)

**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 %)

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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

### Product characteristics

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

### Frequency and duration of use

Exposure duration : < 15 min

### Human factors not influenced by risk management

Exposed skin area : Two hands (960 cm<sup>2</sup>)

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor  
 Remarks : Enhanced general ventilation (5-10 air changes per hour)

### Technical conditions and measures

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

### Product characteristics

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

### Frequency and duration of use

Exposure duration : < 1 h

### Human factors not influenced by risk management

Exposed skin area : Two hands (960 cm<sup>2</sup>)

### 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 %)

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**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 cm<sup>2</sup>)

**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**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterization ratio (PEC/PNEC):
ERC6a	EUSES		Freshwater sediment		0,83 mg/kg dry weight (d.w.)	0,277
			Marine sediment		0,083 mg/kg dry weight (d.w.)	0,277
			Sewage treatment plant		0,021 mg/L	< 0,01

ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)



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**Workers/Consumers**

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

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

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weighing)

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

Not applicable