SAFETY DATA SHEET

Therminol® XP Heat Transfer Fluid

SECTION 1. IDENTIFICATION

Product name: Therminol® XP Heat Transfer Fluid
Product code: 34154-00, P3415405, P3415400, P3415404, P3415403, P3415402, E3415401

Manufacturer or supplier's details
Company name of supplier: Eastman Chemical Company
Address: 200 South Wilcox Drive
        Kingsport TN 37660-5280
Telephone: (423) 229-2000
Emergency telephone: CHEMTREC: +1-800-424-9300, +1-703-527-3887 CCN7321
For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

Recommended use of the chemical and restrictions on use
Recommended use: Heat transfer fluids
Restrictions on use: None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

GHS label elements
Not a hazardous substance or mixture.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Substance
CAS-No.: Not Assigned

Ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>white mineral oil</td>
<td>8042-47-5</td>
<td>100</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES
If inhaled : Remove person to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur. Wash contaminated clothing before reuse.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

If swallowed : Call a physician or poison control center immediately. Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed : The molten product can cause serious burns.

Notes to physician : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Water spray Carbon dioxide (CO2) Dry chemical Foam

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

Hazardous combustion products : Hazardous decomposition products due to incomplete combustion Carbon oxides

Further information : Use a water spray to cool fully closed containers. Do not allow run-off from fire fighting to enter drains or water courses.

Special protective equipment for fire-fighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Ventilate the area. Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray. Avoid contact with skin and eyes. Material can create slippery conditions. Wear appropriate personal protective equipment.
Local authorities should be advised if significant spillages cannot be contained.

Environmental precautions: Clear up spills immediately and dispose of waste safely. Avoid release to the environment.

Methods and materials for containment and cleaning up: Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Advice on safe handling: Do not breathe vapors or spray mist. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from flames and sparks. Wear appropriate personal protective equipment. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Wash contaminated clothing before reuse. Drain or remove substance from equipment prior to break-in or maintenance. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage: Keep container tightly closed in a dry and well-ventilated place. Keep in a cool place away from oxidizing agents.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters: Contains no substances with occupational exposure limit values.

Engineering measures: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment: Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable.
Hand protection

Remarks: Wear suitable gloves. When handling hot material, use heat resistant gloves.

Eye protection: Wear safety glasses with side shields (or goggles).

Skin and body protection: Wear suitable protective clothing.

Protective measures: Ensure that eye flushing systems and safety showers are located close to the working place.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: oily, liquid

Color: colorless

Odor: odorless

Odor Threshold: not determined

pH: not determined

Melting point/range: -29 °C

Boiling point/boiling range: 358 °C

Flash point: 199 °C
   Method: Cleveland open cup

Evaporation rate: not determined

Self-ignition: 346 °C
   Method: ASTM E659

Upper explosion limit: not determined

Lower explosion limit: not determined

Vapor pressure: < 0.007 hPa (20 °C)

Relative vapor density: not determined

Relative density: 0.882 (15 °C)

Density: 875 kg/m³ (25 °C)
Solubility(ies)
Water solubility: negligible

Partition coefficient: n-octanol/water
Pow: > 1,000,000
log Pow: > 6

Autoignition temperature: 346 °C
Method: ASTM E659

Decomposition temperature: not determined

Viscosity
Viscosity, dynamic: 27 - 30 mPa.s (38 °C)
24 - 27 mPa.s (40 °C)

Viscosity, kinematic: 23.7 mm²/s (40 °C)
4.06 mm²/s (100 °C)

Explosive properties: Not classified
Oxidizing properties: Not classified

SECTION 10. STABILITY AND REACTIVITY

Reactivity: None reasonably foreseeable.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions: None known.
Conditions to avoid: Heating in air.
Keep away from flames and sparks.
Incompatible materials: Strong oxidizing agents
Hazardous decomposition products: Emits acrid smoke and fumes when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity
Not classified based on available information.

Product:
Acute oral toxicity: Remarks: No data available
Acute inhalation toxicity: Remarks: No data available
Acute dermal toxicity: Remarks: No data available
**Ingredients:**

**white mineral oil:**

- Acute oral toxicity: LD50 Oral (Rat): > 5,000 mg/kg
- Acute inhalation toxicity: LC50 (Rat): > 5 mg/l  
  Exposure time: 4 h
- Acute dermal toxicity: LD50 Dermal (Rabbit): > 2,000 mg/kg

**Skin corrosion/irritation**

Not classified based on available information.

**Product:**

Remarks: No data available

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**Ingredients:**

**white mineral oil:**

- Species: Rabbit
- Exposure time: 24 h
- Result: none

**Serious eye damage/eye irritation**

Not classified based on available information.

**Product:**

Remarks: No data available

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**Ingredients:**

**white mineral oil:**

- Species: Rabbit
- Result: none
- Exposure time: 24 h

**Respiratory or skin sensitization**

**Skin sensitization**

Not classified based on available information.

**Respiratory sensitization**

Not classified based on available information.

**Product:**

Remarks: No data available

**Germ cell mutagenicity**

Not classified based on available information.
Ingredients:

white mineral oil:
Genotoxicity in vitro:
  Test Type: Mutagenicity - Bacterial
  Metabolic activation: +/- activation
  Method: Bacterial Reverse Mutation Assay
  Result: negative

Genotoxicity in vivo:
  Species: Rat
  Method: Mammalian Bone Marrow Chromosome Aberration Test
  Result: negative

Carcinogenicity
Not classified based on available information.

Product:
Remarks: This information is not available.

Ingredients:

white mineral oil:
Species: Rat
Application Route: Ingestion
Method: OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies
Remarks: negative

IARC
No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA
No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP
No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.

Product:
Effects on fertility:
  Remarks: No data available

STOT-single exposure
Not classified based on available information.

Product:
Remarks: No data available
Ingredients:

white mineral oil:
Assessment: Not classified

STOT-repeated exposure
Not classified based on available information.

Product:
Remarks: No data available

Ingredients:

white mineral oil:
Assessment: Not classified

Repeated dose toxicity

Ingredients:

white mineral oil:
Species: Rat
NOAEL: >= 1,200 mg/kg
Application Route: Oral Study
Exposure time: 90 days

Aspiration toxicity
Not classified based on available information.

Product:
No aspiration toxicity classification

Information on likely routes of exposure

Product:
Inhalation : Remarks: None known.
Skin contact : Remarks: None known.
Eye contact : Remarks: None known.
Ingestion : Remarks: None known.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

white mineral oil:
Toxicity to fish: LL50 (Lepomis macrochirus (Bluegill sunfish)): > 100 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: LL50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h

Toxicity to algae: EL50 (Pseudokirchneriella subcapitata (algae)): > 100 mg/l
Exposure time: 72 h

Persistence and degradability

Product:
Biodegradability: Result: Inherently biodegradable.

Biochemical Oxygen Demand (BOD): Remarks: No data available

Chemical Oxygen Demand (COD): Remarks: No data available

Bioaccumulative potential

Product:
Bioaccumulation: Remarks: Potential bioaccumulation

Mobility in soil

Product:
Distribution among environmental compartments: Remarks: No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Dispose of in accordance with local regulations.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards.
Eastman Chemical Company operates a used fluid return program for certain fluids under these used oil standards.
SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation

49 CFR
Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Component TPQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SARA 311/312 Hazards</td>
<td></td>
<td>No SARA Hazards</td>
</tr>
<tr>
<td>SARA 313</td>
<td></td>
<td>This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.</td>
</tr>
</tbody>
</table>

The ingredients of this product are reported in the following inventories:

DSL : On the inventory, or in compliance with the inventory
AICS : On the inventory, or in compliance with the inventory
ENCS : On the inventory, or in compliance with the inventory
ISHL : On the inventory, or in compliance with the inventory
KECI : On the inventory, or in compliance with the inventory
PICCS : On the inventory, or in compliance with the inventory
IECSC : On the inventory, or in compliance with the inventory
TCSI : On the inventory, or in compliance with the inventory
TSCA : On the inventory, or in compliance with the inventory
TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50% of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative
Further information

NFPA:

Health / Flammability / Instability

0 / 1 / 0

Special hazard.

HMIS® IV:

HEALTH / 0

FLAMMABILITY / 1

PHYSICAL HAZARD / 0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Sources of key data used to compile the Material Safety Data Sheet:

www.therminol.com/products/

Revision Date: 04/11/2018

The information provided in this Material 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.

US / Z8