

SAFETY DATA SHEET

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

Product identifier

Product name: Therminol® VP1 Heat Transfer Fluid

Product No.: 34152-00, P3415201, P3415204, P3415205, P3415203, P3415202, P3415200

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

Identified uses: Heat transfer fluids

Uses advised against: None known.

Details of the supplier of the safety data sheet

Manufacturer / Supplier

Eastman Chemical Company
200 South Wilcox Drive
Kingsport, TN 37660-5280 US
+14232292000

Visit our website at www.EASTMAN.com or email emnsds@eastman.com

Emergency telephone number:

For emergency health, safety, and environmental information, call 1-423-229-4511 or 1-423-229-2000.

For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

SECTION 2: Hazards identification

Hazard Classification:

Health Hazards

Acute toxicity (Inhalation)	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2B
Specific Target Organ Toxicity - Single Exposure (Inhalation)	Category 3

OSHA Specified Hazards: not applicable

Warning label items including precautionary statement:

Pictogram:



Signal Words: Warning

Hazard Statement(s): H315: Causes skin irritation.
H320: Causes eye irritation.
H332: Harmful if inhaled.
H335: May cause respiratory irritation.

Precautionary Statement:

Prevention: P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
P264: Wash thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves.

Response: P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312: Call a POISON CENTER/doctor if you feel unwell.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P337+P313: If eye irritation persists: Get medical advice/attention.
P362: Take off contaminated clothing and wash before reuse.

Storage: P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.

Disposal: P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): No data available.

SECTION 3: Composition/information on ingredients

Substances / Mixtures

General information:

Chemical name	Concentration	Additional identification	Notes
diphenyl oxide	73.5%	CAS-No.: 101-84-8	#
diphenyl	26.5%	CAS-No.: 92-52-4	#

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
This substance has workplace exposure limit(s).

SECTION 4: First aid measures

General: Get medical attention if symptoms occur. Show this safety data sheet to the doctor in attendance. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Place unconscious person on the side in the recovery position and ensure breathing can take place. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Description of first aid measures

Inhalation: Move into fresh air and keep at rest. For breathing difficulties, oxygen may be necessary. Consult a physician for specific advice. Persons who have inhaled vapours or smoke fumes have to be put under medical observation for at least 48 hours, due to the delayed appearance of poisoning.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if symptoms occur.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: If swallowed, rinse mouth with water (only if the person is conscious). Call a physician or poison control center immediately. Do NOT induce vomiting. Never give liquid to an unconscious person. Provide fresh air, warmth and rest, preferably in comfortable upright sitting position. Loosen tight clothing such as a collar, tie, belt or waistband. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms and effects, both acute and delayed: May cause skin and eye irritation. May cause respiratory irritation. Risk of chemical pneumonia after aspiration. Contact with hot material can cause thermal burns which may result in permanent damage.

Indication of any immediate medical attention and special treatment needed

Hazards: Ingestion may result in vomiting; aspiration (breathing) of vomitus into lungs must be avoided as even small quantities may result in aspiration pneumonitis.

Treatment: If swallowed: Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Persons who have inhaled vapours or smoke fumes have to be put under medical observation for at least 48 hours, due to the delayed appearance of poisoning.

SECTION 5: Firefighting measures

General Fire Hazards: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Keep upwind. In case of fire and/or explosion do not breathe fumes. This product is not classified as a fire-resistant heat transfer fluid. Precautions to avoid sources of ignitions should be taken.

Extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Special hazards arising from the substance or mixture: May ignite at high temperature. During fire, gases hazardous to health may be formed. Risk of chemical pneumonia after aspiration. Hazardous combustion products : carbon dioxide, carbon monoxide , soot .

Advice for firefighters

Special fire fighting procedures:

In case of fire: Evacuate area. Move container from fire area if it can be done without risk. Use water spray to keep fire-exposed containers cool. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for fire-fighters:

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

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

No action shall be taken involving any personal risk or without suitable training. Keep unauthorized personnel away. Ventilate closed spaces before entering them. Avoid inhalation of vapors and spray mists. Wear appropriate personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Caution: Contaminated surfaces may be slippery. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental Precautions:

Prevent further leakage or spillage if safe to do so. Clear up spills immediately and dispose of waste safely. Do not contaminate water sources or sewer.

Methods and material for containment and cleaning up:

Small Liquid Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Large Spillages: Dike for later disposal. Collect spillage in containers, seal securely and deliver for disposal according to local regulations. Otherwise, absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Prevent runoff from entering drains, sewers, or streams. For waste disposal, see section 13 of the SDS.

Notification Procedures:

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

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

Do not handle until all safety precautions have been read and understood. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid heat, sparks, open flames and other ignition sources. An eye wash bottle must be available at the work site. Wear appropriate personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Do not taste or swallow. Do not breathe mist or vapor from heated material. In case of inadequate ventilation, use respiratory protection. Do not get in eyes and avoid contact with skin and clothing. Wash promptly with soap and water if skin becomes contaminated. Remove contaminated clothing and wash it before reuse. Destroy or thoroughly clean contaminated shoes. Drain or remove substance from equipment prior to break-in or maintenance. Handle in accordance with good industrial hygiene and safety practice. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities:

Store in a cool, dry place out of direct sunlight. Keep container tightly closed and in a well-ventilated place. Keep upright. Keep in original container. Store locked up. Store away from incompatible materials. Keep away from food, drink and animal feeding stuffs. Store in accordance with local/regional/national/international regulations.

Specific end use(s):

www.therminol.com/products/

SECTION 8: Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Country specific exposure limits have not been established or are not applicable unless listed below.

Chemical name	type	Exposure Limit Values	Source
diphenyl oxide - Vapor.	TWA	1 ppm	US. ACGIH Threshold Limit Values (01 2010)
	STEL	2 ppm	US. ACGIH Threshold Limit Values (01 2010)
	PEL	1 ppm 7 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
biphenyl	TWA	0.2 ppm	US. ACGIH Threshold Limit Values (01 2010)
	PEL	0.2 ppm 1 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)

Exposure controls

Appropriate engineering controls:

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.

Individual protection measures, such as personal protective equipment

General information:

An eye wash bottle must be available at the work site. Provide access to washing facilities including soap, skin cleanser and fatty cream.

Eye/face protection:

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. Recommendations: Wear safety glasses with side shields (or goggles). Use safety goggles and face shield in case of splash risk.

Skin protection**Hand Protection:**

It is a good industrial hygiene practice to minimize skin contact. If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. After contamination with product change the gloves immediately and dispose of them according to relevant national and local regulations. When material is heated, wear gloves to protect against thermal burns.

Other:

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommendations: Apron or other light protective clothing and boots. If prolonged or repeated contact is likely, chemical resistant clothing is recommended. Promptly remove non-impervious clothing that becomes wet or contaminated.

Respiratory Protection:

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. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures:

Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using the product. Wash at the end of each work shift and before eating, smoking and using the toilet. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Keep away from food, drink and animal feeding stuffs.

Environmental Controls:

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels. Do not contaminate water sources or sewer.

SECTION 9: Physical and chemical properties**Information on basic physical and chemical properties****Appearance**

Physical state:	liquid
Form:	Clear Liquid
Color:	Colorless
Odor:	Characteristic
Odor Threshold:	No data available.
pH:	No data available.

Melting Point	12 °C
Boiling Point:	257 °C (1,013 hPa)
Flash Point:	110 °C (Pensky-Martens Closed Cup) 124 °C (Cleveland open cup)
Evaporation Rate:	No data available.
Flammability (solid, gas):	not applicable
Flammability Limit - Upper (%)-:	No data available.
Flammability Limit - Lower (%)-:	No data available.
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Specific Gravity:	1.06 (25 °C)
Solubility(ies)	
Solubility in Water:	0.025 g/l
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	not applicable
Autoignition Temperature:	621 °C (ASTM D2155)
Decomposition Temperature:	No data available.
Dynamic viscosity:	No data available.
Kinematic viscosity:	2.48 mm ² /s (40 °C) 0.99 mm ² /s (100 °C)
Explosive properties:	Not classified.
Oxidizing properties:	Not classified.

SECTION 10: Stability and reactivity

Reactivity:	Material is stable under normal conditions.
Chemical Stability:	Material is stable under normal conditions.
Possibility of Hazardous Reactions:	None under normal conditions.
Conditions to Avoid:	Heating in air. Heat, sparks, flames.
Incompatible Materials:	Strong oxidizing agents.
Hazardous Decomposition Products:	Emits acrid smoke and fumes when heated to decomposition.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:	May cause irritation to the respiratory system. May be harmful if inhaled.
Ingestion:	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia. May be harmful if swallowed.
Skin Contact:	May cause irritation.
Eye contact:	May irritate eyes.

Information on toxicological effects

Oral

Product: Oral LD-50: (Rat): 2,050 mg/kg Not classified.

Dermal

Product: Dermal LD-50: (rabbit): > 5,010 mg/kg
Not classified.

Inhalation

Product: Dusts, mists and fumes: LC50 (Rat, Male and Female, 4 h): 2.66 mg/l (, GLP)
Harmful if inhaled.

Repeated dose toxicity

Product: NOAEC (rat(Male and Female), Inhalation study:): 0.051 mg/l
LOAEL (Rat, by gavage): 500 mg/l

Skin Corrosion/Irritation

Product: (Rabbit, 24 h): slight

Serious Eye Damage/Eye Irritation

Product: (Rabbit, 24 h): slight to moderate irritation

Respiratory or Skin Sensitization

Product: No data available.

Specified substance(s):

diphenyl oxide

Skin Sensitization:, OECD 406: Guinea pig sensitization (Guinea Pig): non-sensitizing
Human experience., Human Repeat Insult Patch Test (Human): non-sensitizing

Specified substance(s):

biphenyl

OECD 406: Guinea pig sensitization (Guinea Pig): non-sensitizing

Carcinogenicity

Product: No data available.

Specified substance(s):

biphenyl

Rat, Male and Female: Ingestion ; OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies
Expert judgment and weight of evidence determination: Not classified

Toxicity to reproduction

Product: No data available.

Specified substance(s):

biphenyl

(Rat, Male and Female); NOAEL: 40 mg/kg; NOAEL: 40 mg/kg; NOAEL: 40 mg/kg; Ingestion; Remarks: There is no evidence to indicate potential for adverse reproductive effects in humans.

Developmental toxicity

Product: Rat; NOAEL: 500 mg/kg; NOAEL: < 50 mg/l; Gavage (Oral); OECD Test No. 414: Prenatal Developmental Toxicity Study; Remarks: Conclusive but not sufficient for classification

Germ Cell Mutagenicity**In vitro**

Product: Salmonella typhimurium assay (Ames test) (Bacterial Reverse Mutation Assay):
negative Conclusive but not sufficient for classification
Chromosomal aberration (In vitro Mammalian Chromosome Aberration Test):
negative Conclusive but not sufficient for classification

In vivo

Product: Mammalian Erythrocyte Micronucleus Test (Mammalian Erythrocyte Micronucleus Test) (Mouse): negative

Specific Target Organ Toxicity - Single Exposure

Product: Inhalation: Irritating to respiratory system.

Specific Target Organ Toxicity - Repeated Exposure

Product: Oral: Not classified.

Aspiration Hazard

Product: Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia. Not classified.

Other effects:

No data available.

SECTION 12: Ecological information**Ecotoxicity:****Acute hazards to the aquatic environment:****Fish**

Product: LC-50 (Oncorhynchus mykiss, 96 h): 7.6 mg/l

Aquatic Invertebrates

Product: LC-50 (Daphnia magna, 48 h): 2.4 mg/l

Chronic hazards to the aquatic environment:**Fish**

Product: No data available.

Specified substance(s):

biphenyl NOEC (Oncorhynchus mykiss, 96 d): 0.229 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s):

biphenyl NOEC (Daphnia magna, 21 d): 0.17 mg/l

Toxicity to Aquatic Plants

Product: EC-50 (Selenastrum capricornutum, 72 h): 1.3 mg/l

Persistence and Degradability**Biodegradation**

Product: Inherently biodegradable

BOD/COD Ratio**Product:** No data available.**Bioaccumulative Potential****Bioconcentration Factor (BCF)****Product:** No data available.**Specified substance(s):**diphenyl oxide Common Carp, Bioconcentration Factor (BCF): 49 - 594 (OECD Guideline Test No. 305: Bioaccumulation in Fish: Aqueous and Dietary Exposure)
Rainbow Trout, Bioconcentration Factor (BCF): 196

biphenyl Bioconcentration Factor (BCF): 1,900

Partition Coefficient n-octanol / water (log Kow)**Product:** Log Kow: not applicable**Mobility in Soil:** No data available.**Known or predicted distribution to environmental compartments**

diphenyl oxide soil - Log Koc: 3.3 (Measured)

biphenyl soil - Log Koc: 3.19 (OECD Test No. 106: Adsorption - Desorption Using a Batch Equilibrium Method)

Other Adverse Effects: No data available.**SECTION 13: Disposal considerations****Waste treatment methods****General information:**

The generation of waste should be avoided or minimized wherever possible. Dispose of waste and residues in accordance with local authority requirements.

Disposal methods:

This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24, due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311 for the compound D018 BENZENE. Consult 40 CFR 268.40 or appropriate local regulations for concentration based standards. 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. Contact your Sales Representative for details. Do not allow to enter drains, sewers or watercourses.

Since emptied containers retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT

Reportable Quantity: 171 kg (biphenyl)

Marine pollutant.: diphenyl

Possible Shipping Description(s):

UN 3082 Environmentally hazardous substance, liquid, n.o.s. (biphenyl) 9 III

IMDG - International Maritime Dangerous Goods Code

Marine pollutant.: (diphenyl)

Possible Shipping Description(s):

UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Diphenyl Ether, biphenyl) 9 III

IATA

Class 9, Packing Group III when shipped by air from or to the Netherlands or between European Union and Australia; otherwise, not regulated.

Possible Shipping Description(s):

UN 3082 Environmentally hazardous substance, liquid, n.o.s. (Diphenyl Ether, biphenyl) 9 III

SECTION 15: Regulatory information

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

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: D/2/B

SARA 311-312 Hazard Classification(s):

immediate (acute) health hazard

US EPCRA (SARA Title III) Section 313 - Toxic Chemical List

BIPHENYL

OSHA: hazardous

TSCA (US Toxic Substances Control Act): All components of this product are listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): All components of this product are listed on the DSL. Any impurities present in this product are exempt from listing.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): All components of this product are listed on AICS or otherwise comply with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): All components of this product are listed in the Handbook or have been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): All components of this product are listed on the Korean inventory or otherwise comply with the Korean Toxic Substances Control Act.

Philippines Inventory (PICCS): All components of this product are listed on the Philippine inventory or otherwise comply with PICCS.

Inventory of Existing Chemical Substances in China: All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

SECTION 16: Other information

HMIS® Hazard Ratings: Health - 2, Flammability - 1, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

Revision Information: Not relevant.

Key literature references and sources for data: www.therminol.com/products/

Training information: No data available.

Issue Date: 05/07/2015

SDS No.:

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.