

MATERIAL SAFETY DATA SHEET

SECTION (1): PRODUCT INFORMATION

PRODUCT NAME: UCARTHERM CLEAR HEAT TRANSFER FLUID

COMMON NAMES: THERMAL FLUID 17, PM-6195

CAS REGISTRY NUMBER: N/AP (mixture) FORMULA: N/AP (mixture)
CHEMICAL NAME: Ethylene glycol (mixture) MOLECULAR WEIGHT: N/AP (mixture)
CHEMICAL FAMILY: Ethylene glycol PRODUCT USE: Heat Transfer Fluid.

EMERGENCY NUMBER: CHEMTREC (800) 424-9300

WHMIS CLASSIFICATION: D.2A D.2B

TRANSPORTATION OF DANGEROUS GOODS CLASSIFICATION

TDG Classification: Non-Regulated

UN: Non-Regulated

Listed on the Domestic Substances List (DSL): Yes

SECTION (2): HAZARDOUS INGREDIENTS

Component(s)/CAS No.	<u>% wt.</u>	Exposure Limits, ppm	
		<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Ethylene glycol (107-21-1)	94	50* vapour	50* vapour
Potassium hydroxide (1310-58-3)	1	2 mg/m3*	2 mg/m3*
Water and processing additives (N/A)	3	N/D	N/D
Dipotassium hydrogen phosphate (7758-11-4)	2	N/D	N/D

*Ceiling Local regulated limits may vary.

SECTION (3): PHYSICAL PROPERTIES (typical values. May vary from sample to

Boiling point (C at 760 mm Hg):	164.5
Melting point:	N/D
Freezing point:	-24C
Specific gravity (water=1):	1.133 at 20/20 C
Vapour pressure (at 20 C):	1.2 mmHg
Vapour density (air=1):	2.1
pH:	N/D
Solubility in water (% by weight):	100
% Volatile:	96.27 by weight
Evaporation rate (butyl acetate=1):	0.1
Odour threshold:	N/D
Coefficient of water/oil distribution:	N/D
Appearance and odour:	Transparent colourless liquid, mild odour.
Physical state:	Liquid.

SECTION (4): FIRE AND EXPLOSION HAZARD DATA

Flash point/Method:	126.7 C, Pensky-Martens closed cup, ASTM D 93 129.4 C, Cleveland open cup, ASTM D 92
Lower flammable limit, % by volume:	approx. 3.2
Upper flammable limit, % by volume:	approx. 15
Upper and lower limits for ethylene glycol.	
Autoignition temperature:	N/D
Extinguishing media:	Use alcohol type or all-purpose-type foam by manufacturers' recommended techniques for large fires. Use water spray, carbon dioxide, or dry chemical media for small fires.
Special Fire Fighting procedures:	Do not spray pool fires directly; a solid stream of water or foam directed into hot, burning liquid may cause frothing. Use self-contained breathing apparatus and protective clothing.
Unusual Fire and Explosion Hazards:	None currently known.
Hazardous Combustion Products:	Burning can produce carbon dioxide and/or carbon monoxide.
Explosion Data:	
Sensitivity to Mechanical Impact:	N/D
Sensitivity to Static Discharge:	N/D
Conditions of Flammability:	N/D

SECTION (5): REACTIVITY DATA

Stability:	Stable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	None currently known
Materials to Avoid:	Explosive decomposition may occur if combined with strong acids or strong bases and subjected to elevated temperatures. Therefore, avoid strong acids and strong bases at elevated temperatures. Avoid contamination with strong oxidizing agents, and materials reactive with hydroxyl compounds.
Hazardous Decomposition Products:	Burning can produce carbon dioxide and/or carbon monoxide.
Conditions of Reactivity:	None currently known.

SECTION (6): TOXICOLOGICAL PROPERTIES

Ethylene Glycol

LD50 Oral (rat):	4700 mg/kg, RTECS (1991)
LD50 Dermal (rabbit):	9530 mg/kg, RTECS (1991)
LC50 (species):	N/D

Potassium hydroxide

LD50 Oral (rat):	273 mg/kg, RTECS (1991)
LD50 Dermal (rabbit):	N/D
LC50 (species):	N/D

Water & processing additives

LD50 Oral (rat):	N/D
LD50 Dermal (rabbit):	N/D
LC50 (species):	N/D

Dipotassium Hydrogen Phosphate

LD50 Oral (rat):	N/D
LD50 Dermal (rabbit):	N/D
LC50 (species):	N/D

CARCINOGENICITY: Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increases in tumour incidence, or a different pattern of tumours compared with untreated controls.

SECTION (6): TOXICOLOGICAL PROPERTIES (cont'd)

The absence of a carcinogenic potential for ethylene glycol has been supported by numerous in vitro genotoxicity studies showing that it does not produce mutagenic or clastogenic effects. Sodium tolytriazole has demonstrated mutagenic activity in a bacterial test system. A correlation has been established between mutagenic activity and carcinogenic activity in many chemicals.

SENSITIZATION: Repeated skin contact may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material.

IRRITANCY: N/D

REPRODUCTIVE EFFECTS: N/D

TERATOGENICITY: Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect dose for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations 150, 1000, and 2500 mg/m³ for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m³) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m³). The no-effect concentration (based on maternal toxicity) was 500 mg/m³. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen; there is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity; exposure to high aerosol concentration is only minimally effective in producing developmental toxicity; the major route for producing developmental toxicity is perorally.

MUTAGENICITY: Numerous in vitro genotoxicity studies have shown that ethylene glycol does not product mutagenic or clastogenic effects. Sodium tolytriazole has demonstrated mutagenic activity in a bacterial test system.

PRODUCT NAME: UCARTHERM (cont'd)

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SECTION (6): TOXICOLOGICAL PROPERTIES (cont'd)

TOXICOLOGICALLY SYNERGISTIC PRODUCTS: N/D

OTHER DATA: N/D

ENVIRONMENTAL EFFECTS: N/D

SECTION (7): PREVENTATIVE MEASURES

Ventilation (Engineering Controls): General (mechanical) room ventilation is expected to be adequate if handled in covered equipment. Local exhaust ventilation is needed at points where vapours can be expected to escape to the work place air.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: NIOSH or MSHA approved self-contained breathing apparatus in high vapour concentrations.

Eye: Monogoggles or face shield.

Clothing: N/D

Footwear: N/D

Hands: Natural rubber, nitrile, neoprene, or PVC gloves.

Other Protective Measures: Eye bath and safety shower.

SPILL, LEAK AND DISPOSAL PROCEDURES:

Action to take for spills or leaks: Wear suitable protective equipment. Small spills can be flushed with large amounts of water. Larger spills should be collected for disposal.

Waste Disposal Method: Incinerate in a furnace where permitted under appropriate federal, provincial, and local regulations. At very low concentrations in water, ethylene glycol is readily biodegradable in a biological waste water treatment plant.

Storage and Handling Precautions and Equipment: DANGER! Harmful or fatal if swallowed. Causes eye irritation. Prolonged or repeated breathing of mist or vapour is harmful. May cause kidney and nervous system damage. Ethylene glycol causes birth defects in laboratory animals.

Do not swallow. Avoid contact with eyes. Do not breathe mist from spray. Avoid prolonged or repeated breathing of vapour. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Special Shipping Information: N/D

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SECTION (7): PREVENTATIVE MEASURES (cont'd)

Other Precautions: The maximum recommended skin temperature on the heat transfer fluid side of a heat exchanger is 160C. If the fluid is exposed to excessively high temperatures, thermal degradation can occur; organic acids and other irritating fumes could result. Respiratory protection, such as an air-supplied mask, may be needed until the fumes can be removed.

Undyed, this heat transfer fluid is not suitable for use in any system where contamination of drinking water supply is possible.

WARNING: Sudden release of hot organic chemical vapours or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions.

SECTION (7): PREVENTATIVE MEASURES (cont'd)

Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapours."

SECTION (8): FIRST AID PROCEDURES

IF INHALED: Remove to fresh air. Call a physician if symptoms persist.

IN CASE OF EYE CONTACT: Immediately flush eyes with water for several minutes.

IN CASE OF SKIN CONTACT: Remove contaminated clothing and flush skin with water.

IF INGESTED: If conscious, give 2 glasses of water and induce vomiting. Call a physician immediately. If medical advice is delayed and the person has swallowed moderate volumes of ethylene glycol (a few ounces), then give three to four ounces of hard liquor such as whisky.

SECTION (8): FIRST AID PROCEDURES(cont'd)

Notes to Physician: The principal toxic effects of ethylene glycol, when swallowed, are kidney damage and metabolic acidosis. Ethanol is antidotal, and its early administration may block the formation of nephrotoxic metabolites of ethylene glycol in the liver. Ethanol should be given intravenously, as a 5% solution in sodium bicarbonate, at a rate of about 10 mL ethanol per hour. A desired therapeutic level of ethanol in blood is 100 mg/dL. Hemodialysis may be required. 4-Methylpyrazole, a potent inhibitor of alcohol dehydrogenase, has been used therapeutically to decrease the metabolic consequences of ethylene glycol poisoning before coma, seizure, and renal failure have occurred (20 mg/kg/day).

Pulmonary oedema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism of production has not been elucidated, but it appears to be non cardiogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end-expiratory pressure may be required. There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth, and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing, and dysphagia.

PRIMARY ROUTES OF EXPOSURE: Inhalation, eye contact, ingestion.

SIGNS, SYMPTOMS AND EFFECTS OF EXPOSURE:

Inhalation: May cause irritation of the nose and throat with headache, particularly from mists. High vapour concentrations, (caused, for example, by heating the material in an enclosed and poorly ventilated workplace) may produce nausea, vomiting, headache, dizziness, and irregular eye movements.

Eye Contact: Liquid, vapour, and mist may cause discomfort in the eye with persistent conjunctivitis, seen as slight excess redness of the conjunctiva. Serious corneal injury is not anticipated.

Skin Contact: No evidence of adverse effects from available information.

Skin Absorption: No evidence of adverse effects from available information.

Ingestion: May cause abdominal discomfort or pain, nausea, vomiting, dizziness, drowsiness, malaise, blurring of vision, irritability, lumbar pain, oliguria, uremia, and central nervous system effects, including irregular eye movements, convulsions, and coma. Cardiac failure and pulmonary oedema may develop. Severe kidney damage follows the swallowing of large volumes of ethylene glycol. May be fatal. A few reports have been published describing the development of weakness of the facial muscles, diminished hearing, and difficulty with swallowing during the late stages of severe poisoning

SECTION (8): FIRST AID PROCEDURES (cont'd)

Chronic Effects of Exposure: Effects of repeated overexposure: Inhalation of mists may produce signs of central nervous system involvement, particularly dizziness and nystagmus.

Medical Conditions Aggravated by Exposure: May aggravate existing kidney diseases.

Additional Information: N/D

SECTION (9): PREPARATION DATA

Prepared by MSDS Coordinator.

Phone: (306) 347-0444

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LEGEND: N/AP - Not Applicable N/D - No Data Available