



Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

IMPERIAL HD Universal Antifreeze

Product Number(s): Imperial Heavy Duty Universal Antifreeze

Company Identification

Imperial Sales Co.
7600 Dublin Blvd.
Suite 240
Dublin, CA 94568

Transportation Emergency Response

(24 hr): (925) 556-5530

Health Emergency

(925) 556-5530



Product Information

Product Information: 925-556-5530
MSDS Requests: 925-556-5530

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

Comp	CAS No.	Wt %	PEL (OSHA)	TLV (ACGIH)
Ethylene Glycol	107-21-1	90 to 95	50 ppm	50 ppm
Diethylene Glycol	111-46-6	</ = 5	None	None

SECTION 3 HAZARDS IDENTIFICATION

Appearance

Green liquid

Odor

Slight odor

NFPA:

1

Health

1

Flammability

0

HMIS:

2

1

0

Key:

Minimal – 0, Slight – 1, Moderate – 2, Serious – 3, Severe - 4

Principal Hazards

WARNING.

- MAY BE FATAL IF SWALLOWED.
- VAPORS CAN CAUSE EYE IRRITATION.

Minimum LD50 (Oral) (CAS 107-21-1)

5840 mg/ kg (rats)

Minimum LD50 (Skin) (CAS 107-21-1)

9530 mg/ kg (rabbits)

This material is considered hazardous by the OSHA Hazard Communication Standard 29CFR 1910.1200. See Section 11 for complete health hazard information.

SECTION 4 FIRST AID MEASURES

Eyes

Immediately flush with water at least 15 minutes, lifting lower and upper lids. Contact

lenses should never be worn when working with this chemical. Get medical attention as soon as possible.

Skin Wash with plenty of soap and water. Immediately remove contaminated clothing. If skin irritation occurs, get medical attention. Launder contaminated clothing before reuse and discard leather articles saturated with the material.

Inhalation Remove exposed person to fresh air and call **emergency medical care**. If breathing is labored, administer oxygen. If breathing has stopped, apply artificial respiration.

Oral Obtain medical attention immediately. If patient is fully conscious, give two glasses of water. **DO NOT INDUCE VOMITING**. If medical advice is delayed, and if the person has swallowed a moderate volume of material (a few ounces), then give three to four ounces of hard liquor, such as whiskey. For children, give proportionately less liquor, according to weight.

Notes to physician: It is estimated that the lethal oral dose to adults is of the order of 1.0 ml/ kg. Ethylene glycol is metabolized by alcohol dehydrogenate to various metabolites including glyceraldehydes, glycolic acid and oxalic acid which cause an elevated anion-gap metabolic acidosis and renal tubular injury. The signs and symptoms in ethylene glycol poisoning are those of metabolic acidosis, CNS depression, and kidney injury. Urinalysis may show albuminuria, hematuria and oxaluria. Clinical chemistry may reveal anion-gap, metabolic acidosis and uremia. The currently recommended medical management of ethylene glycol poisoning includes elimination of ethylene glycol and metabolites, correction of metabolic acidosis and prevention of kidney injury. It is essential to have immediate and follow-up urinalysis and clinical chemistry. There should be a particular emphasis on acid-base balance and renal function tests. A continuous infusion of 5% sodium bicarbonate with frequent monitoring of electrolytes and fluid balance is used to achieve correction of metabolic acidosis and forced diuresis. As a competitive substrate for alcohol dehydrogenase, ethanol is antidotal. Given in the early stages of intoxication, it blocks the formulation of nephrotoxic metabolites. A therapeutically effective blood concentration of ethanol is in the range of 100-150 mg/dl, and should be achieved by a rapid loading dose and maintained by intravenous infusion. For severe and/or deteriorating cases, hemodialysis may be required. Dialysis should be considered for patients who are symptomatic, have severe metabolic acidosis, a blood ethylene glycol concentration greater than 25 mg/dl, or compromise of renal functions.

A more effective intravenous antidote for physician use is 4-methylpyrazole, a potent inhibitor of alcohol dehydrogenases, which effectively blocks the formation of toxic metabolites of ethylene glycol. It has been used to decrease the metabolic consequences of ethylene glycol poisoning before metabolic acidosis coma, seizures, and renal failure have occurred. A generally recommended protocol is a loading dose 15 mg/kg followed 10 mg/kg every 12 hours for 4 doses and then 15 mg/kg every 12 hours until ethylene glycol concentrations are below 20 mg/ 100 ml. Slow intravenous infusion is required. Since 4-methylpyroazole is dialyzable, increased dosage may be necessary during hemodialysis. Additional therapeutic measures may include the administration of cofactors involved in the metabolism of ethylene glycol. Thiamine (100 mg) and pyridoxine (50 mg) should be given every six hours.

Pulmonary edema 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 dysphasia.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point	247 °F (119 °C) Setaflash
Auto ignition Temperature:	Ethylene glycol is 748 °F (398 °C)
Flammability Limits:	LFL is 3.2% UFL is 15.3%

Extinguishing Media	CO ₂ , dry chemical, or foam. Water Fog or fine spray can be used to cool and protect exposed material.
NFPA RATINGS:	Health 1; Flammability 1; Reactivity 0.
Firefighting Procedures	For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Unusual Fire & Explosion Hazards	No fire and explosion hazards expected under ambient storage and handling conditions.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Spill Procedures	Evacuate all non-essential personnel. Personal Protective Equipment must be worn, see Personal Protection Section for PPE recommendations. Remove sources of ignition. Ventilate spill area. Prevent entry into sewers and waterways, dispose of in accordance with all federal, state and local environmental regulation. Do not dispose in landfill. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material. Check under Transportation and Labeling (DOT/CERCLA) and Other Regulatory Information Section (SARA) for hazardous substances to determine regulatory reporting requirements for spills.
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SECTION 7 HANDLING AND STORAGE

Handling Procedures. Keep away from potential sources of ignition. Open container in a well ventilated area. Avoid breathing vapors. Keep containers closed when not in use. Do not discharge into drains or the environment, dispose to an authorized waste collection point. Use appropriate containment to avoid environmental contamination. Product on surfaces can cause slippery conditions. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Launder contaminated clothing before reuse. Empty containers retain material residue. Do not cut, weld, braze, solder, drill, grind or expose containers to heat, flame, spark or other sources of ignition.

Storage Procedures Do not store near potential sources of ignition. Store in well ventilated place. Product may become a solid at temperatures below -18 °C (0 °F). Do not store near food, foodstuffs, drugs or potable water supplies. Keep out of reach of children.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

<u>Component</u>	<u>Exposure Limits</u>	<u>Skin Form</u>
Ethylene glycol	100 mg/m3 CEILING ACGIH	Aerosol
Ethylene glycol	125 mg/m3 CEILING OSHA-vacated 50 ppm CEILING OSHA – vacated	
Diethylene glycol	100 mg/m3 CEILING UCC	Aerosol and Vapor
Diethylene glycol	50 ppm TWA8 AIHA WEEL	Aerosol and Vapor
Diethylene glycol	10 mg/m3 TWA8 AIHA WEEL	Aerosol

In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.

A "blank" in the Skin column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.

Engineering Controls	Use material in well ventilated area only. Additional ventilation or exhaust May be required to maintain air concentrations below recommended exposure limits.
Gloves Procedures	Use butyl rubber or neoprene gloves.
Eye Protection	Safety glasses. If potential for splash or mist exists, wear chemical goggles or face shield.
Respiratory Protection	Use NIOSH/MSHA approved full face respirator with a combination organic vapor and dust/mist cartridge if the recommended exposure limit is exceeded. Use self-contained breathing apparatus for entry into confined space, for other poorly ventilated areas and for large spill clean-up sites.
Clothing Recommendation	Long sleeve shirt is recommended. Wear either a chemical protective suit or apron when potential for contact with material exists. Use butyl rubber or neoprene boots when necessary to avoid contaminating shoes. Do not wear rings, watches, contact lenses or similar apparel that could entrap the material and cause a skin reaction. Launder contaminated clothing before reuse.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point	175 °C (348 °F)
Freeze Point	-18 °C (0 °F)
Explosion Data	Material does not have explosive properties.
Vapor Pressure	<0.1
pH (50% in water)	8.0
Specific Gravity	1.12 (15.6 °C)
Pound/ gallon	9.3
Water Solubility	Complete
Odor	Mild
Appearance	Green liquid.
Odor Threshold	Unknown.

The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.

SECTION 10 STABILITY AND REACTIVITY

Stability	Material is normally stable at room temperature and pressure. See the Handling and Storage Section for further details.
Decomposition Temp.	Not determined.
Incompatibility	Strong acid or oxidizing agents.
Polymerization	Will not occur.

Thermal Decomposition	Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion.
Conditions to Avoid	Keep away from flame.

SECTION 11 TOXICOLOGICAL INFORMATION

Skin: The dermal LD50 has not been determined.

Ingestion: The lethal dose in humans is estimated to be 100 ml (3 oz.). The oral LD50 for rats is in the 6,000 – 13,000 mg/kg range.

Mutagenicity: Animal and in-vitro mutagenicity studies were negative.

Significant Data with Possible Relevance to Humans: 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 doses 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 made to aerosol at concentrations of 150, 1000 and 25000 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 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 25000 mg/m³) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m³). The no-effects 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 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 concentrations is only minimally effective in producing developmental toxicity. The major route for producing developmental toxicity is perorally. Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increases in tumor incidence or a different pattern of tumors compared with untreated controls. The absence of carcinogenic potential for ethylene glycol has been supported by numerous in vitro genotoxicity studies showing that it does not produce mutagenic or clastogenic effects. A chronic dietary feeding study of diethylene glycol with rats showed mild kidney injury at 1%, while concentrations of 2% and 4% caused more marked kidney injury. In addition, at 2% and 4% of diethylene glycol in the diet, some rats developed benign papillary tumors in the urinary bladder. These have been attributed to the presence of urinary bladder calcium oxalate stones. No evidence for carcinogenicity was found with a chronic skin-painting study with diethylene glycol in mice. The absence of a direct chemical carcinogenic effect adds with the results in vitro genotoxicity studies that show that it does not produce mutagenic or clastogenic effects. A feeding study employing up to 5.0% diethylene glycol in the diet failed to produce any teratogenic effects. In a mouse continuous breeding study with large doses of diethylene glycol in drinking water, there was evidence for reproductive toxicity at 3.5% (equivalent to 6.1 g/kg/day) as reduced number of litter, live pups per litter and live pup weight. No such effects were seen at 1.75% (approximately 3.05 g/kg/day). The relevance of these very high dosages to human health is uncertain. Pregnant rats receiving undiluted diethylene glycol by gavage over the period of organogenesis had toxic effects at 4.0 and 8.0 ml/kg/day as mortality, decreased body weight, decreased food consumption increased water consumption and increased liver and kidney weights. Fetotoxicity was seen only at these maternally toxic dosages. Decreased fetal body weight occurred at 8.0 ml/kg/day, and increased skeletal variants at 4.0 and 8.0 ml/kg/day. No embryotoxic or teratogenic effects were seen. Neither maternal toxicity nor fetotoxicity occurred at 1.0 ml/kg/day. In a study with mice also receiving undiluted

diethylene glycol over the period of organogenesis, maternal toxicity occurred at 2.5 and 10.0 ml/kg/day, but not at 0.5 ml/kg/day. Definitive developmental toxicity was not seen in this species.

-- ACUTE EXPOSURE --

Peroral: The lethal dose in humans is estimated to be 3 oz. or 100 ml. Rat: LD50 (6000- 13000) mg/kg

Percutaneous: Rabbit LD50 = >22,270 mg/kg; 24 hr. occluded

Inhalation:

Rat: 8 hr exposure, substantially saturated vapor studies, dynamic generation method. No mortality 0/6. Mist/vapor study, rat, at 170 °C, 8 hr exposure = 2.2 mg/l. No mortality 0/6

Rat: 8 hr exposure, fog = 10,000 ppm; 65 – 70 °C. No mortality 0/6

-- CHRONIC EXPOSURE --

Skin Irritation:

Rabbit: 24 hr occluded contact, 0.5 ml. Results: minor erythema and edema.

Human: Primary irritation patch test, 48 hr. occluded, 0.2 ml. Results: evidence of irritation.

Eye Irritation: If material is misted or if vapors are generated from heating, exposure may cause irritation of mucous membranes and the upper respiratory tract. Based on data from components and similar materials.

Related exposure: In a 7 day dietary study with rats, a significant increase in kidney weights in females was observed at 5.0 gm/kg. the NOEL was 2.5 gm/kg.

Repeated skin contact with ethylene glycol 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.

Chronic Toxicity and Carcinogenicity: Two chronic feeding studies, using rats and mice, have not produced any evidence that ethylene glycol causes dose-related increase in tumor incidence or a different pattern of tumors compared with untreated controls. 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.

Reproductive Toxicity A three generation study indicated that ethylene glycol did not affect reproductive parameters at dietary concentrations up to 1.0 gm/kg/day in any generation.

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.

-- ADDITIONAL INFORMATION --

Other: None

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY:

This material is practically non-toxic to aquatic organisms on an acute basis (LC50 > 100 mg/ l) in the most sensitive species.

Bacterial/ NA: 16 hr; IC50 > 10,000 mg/l

Daphnia: 48 hr; LC50 > 100,000 mg/l

Fathead minnow: 94 hr; LC50 70,000 mg/l

ENVIRONMENTAL FATE: Bioconcentration potential is low (BCF less than 100). Log octanol/water partition coefficient is -1.36. Bioconcentration factor is 10 in golden orfe.

BOD (% Oxygen Consumption): Day 5 = 51%, Day 10 = 80%, Day 20 = 97%

SECTION 13 DISPOSAL CONSIDERATIONS

Waste Disposal Do not discharge to sewer. Wear appropriate personal protection. Take up with sand, vermiculite, or similar inert material. Dispose in accordance with federal, state and local regulations.

SECTION 14 TRANSPORT INFORMATION

ICAO/IATA (US) Not regulated.

ICAO/IATA (International) Not regulated.

IMDG Not regulated (in quantities under 5,000 lbs in any one inner package).

IMDG EMS Fire Not applicable.

IMDG EMS Spill Not applicable.

IMDG MFAAG Not applicable.

IMO Marine Vessel ADDITIONAL INFORMATION REQUIRED

U.S. Barge ADDITIONAL INFORMATION REQUIRED

USCG Compatibility Not determined.

U.S. DOT Bulk Environmentally Hazardous Substance, Liquid N.O.S. (Ethylene Glycol) UN 3082, hazard class 9, $\leq 5,000\text{ lb.}$, PG III

U.S. DOT Non-Bulk Not regulated.

DOT NAERG 128

TDG Bulk Not regulated.

TDG Non-Bulk Not regulated.

Mexico Not regulated.

Mexico Non-Bulk Not regulated.

Bulk Quantity 85000 liters, 22457 gal.

Non-Bulk Quantity 207.8 liters, 55 gal.

Review classification requirements before shipping materials at elevated temperatures

SECTION 15 REGULATORY INFORMATION

-- Global Chemical Inventories --

USA All components of this material are on the US TSCA Inventory or are exempt.

Canadian Regulations: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required.

WHMIS Information: D2A – material has potential toxic effects. Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

Other TSCA Reg. None

-- Other U.S. Federal Regulations --

SARA Ext. Haz. Subst.

SARA Section 313 Emission Reporting: Ethylene glycol is subject to Form R reporting requirements. substance) of any chemical substances listed under SARA Section 313.

SARA 311/ 312 Classifications Acute Hazard; chronic hazard, 312 reporting; ethylene glycol is subject to Tier I and/or Tier II annual inventory reporting.

CERCLA Hazardous Reportable Quantity 5,000 pounds (532 gallons)

FDA Approval Not applicable.

-- State Regulations --

State Right-To-Know:

California - Exposure Limits - Ceilings:	vapor-50 ppm ceiling; 125 mg/m ³ ceiling
Director's List of Hazardous Substances:	listed
Florida - Hazardous Substances List:	listed
Massachusetts - Right-to-Know List:	listed

Minnesota - Haz. Subs. List: listed (particulate and vapor)
 New Jersey - Right-to-Know List (Total): Present greater than 1.0%
 Pennsylvania Right-to-Know List: environmental hazard

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986): This product contains the following chemical(s) known to the State of California to cause cancer:

Component	CAS #	Amount
1,4 – Dioxane	123-91-1	<=0.0086%
Acetaldehyde	75-07-0	<=0.1000PPM

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986): This product contains the following chemical(s) known to the State of California to cause birth defects and/or other reproductive harm.

Component	CAS #	Amount
Ethylene glycol monomethyl ether	109-86-4	<=0.0009%

California SCAQMD Rule 443.1 VOC: Vapor pressure 0.06 mm Hg at 20 °C, 1113.38 g/l

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health 1; Flammability 1; Reactivity 0; (Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: Revision Date: 10/15/2010

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
IPAC – International Petroleum Chemicals & Additives Co.	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by IPAC, 7600 Dublin Blvd, Suite 240, Dublin, CA 94568.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.