



MATERIAL SAFETY DATA SHEET *Attn Rod.*

SECTION 1 - PRODUCT INFORMATION

Product Name: Propane
Trade Name: LPG (Liquified Petroleum Gas), LP-Gas
Chemical Formula: C_3H_8

Supplier: Superior Propane Inc.
1111 - 49th Avenue N.E.
Calgary, AB T2E 8V2

WHMIS CLASSIFICATION

Class A - Compressed Gas
Class B, Division 1 - Flammable Gas

Business: (403) 730-7500

Local Market
Emergency Number:

(Non Medical)

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.

SECTION 2 - HAZARDOUS INGREDIENTS

COMPONENTS	CAS NO.	% Volume (v/v)	LD50
Propane	74-98-6	90% - 99%	Not Applicable
Propylene	115-07-1	0% - 5%	Not Applicable
Ethane	74-84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106-97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:

Based upon animal test data, the acute toxicity of this product is expected to be inhalation; 4 hour LC50 = 280,000 ppm (Rat).

Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada. Exact composition will vary from shipment to shipment.

SECTION 3 - CHEMICAL AND PHYSICAL DATA

Form: Liquid and vapour while stored under pressure.

Boiling Point: $-42^{\circ}C$ @ 1 atm

Freezing Point: $-188^{\circ}C$

Evaporation Rate: Rapid (Gas at normal ambient conditions).

Vapour Pressure: 1435 kPa (maximum) @ $37.8^{\circ}C$

Vapour Density: 1.52 (Air = 1)

Coefficient of Water/Oil Distribution: Not available

pH: Not available.

Solubility in water: Slight, 6.1% by volume @ $17.8^{\circ}C$

Specific Gravity: 0.51 (water = 1)

Appearance/Odour: Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.*

Odour Threshold: 4800 ppm

* With proper handling, transportation and storage, adding a chemical odourant such as eth-merc has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

SECTION 4 - FIRE OR EXPLOSION HAZARD

Flash Point: $-103.4^{\circ}C$

Method: Closed cup.

Flammable Limits: Lower 2.4%, Upper 9.5%

Auto Ignition Temperature: $432^{\circ}C$

Products Evolved Due To Heat Or Combustion: Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.

Fire and Explosive Hazards: Explosive air-vapour mixtures may form if allowed to leak to atmosphere.

Sensitivity To Impact: No.

Sensitivity To Static Discharge: Yes.

Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent flame impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus.

SECTION 5 - REACTIVITY DATA

Stability: Stable.

Conditions To Avoid: Keep separate from oxidizing agents. Gas explodes spontaneously when mixed with chloride dioxide.

Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible material, drains and openings to building.

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

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SECTION 6 - TOXICOLOGICAL PROPERTIES OF MATERIAL

ROUTES OF ENTRY:

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vapourizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: The acute toxicity of this product is expected to be inhalation: 4 hour LC50=280,000ppm (Rat).

Chronic Exposure: There are no reported effects from long term low level exposure.

Sensitization to Product: Skin-unknown.

Respiratory-unknown.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant. ACGIH TLV: 1000 ppm.

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported

SECTION 7 - PREVENTIVE MEASURES

Eyes: Safety glasses, are recommended when transferring product.

Skin: Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.

Inhalation: Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.

Ventilation: Explosion proof ventilation equipment required in confined spaces.

SECTION 8 - EMERGENCY AND FIRST AID PROCEDURES

FIRST AID:

Eyes: Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.

Skin: In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.

Ingestion: None considered necessary.

Inhalation: Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.

SPILL OR LEAK:

Eliminate leak if possible.

Eliminate source of ignition.

Ensure cylinder is upright.

Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

SECTION 9 - TRANSPORTATION, HANDLING AND STORAGE

Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).

- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.

Do not store with oxidizing agents, oxygen, or chlorine cylinders.

- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG)

- TDG Classification: Flammable Gas 2.1

- TDG Shipping Name: Liquefied Petroleum Gas (Propane)

- TDG Special Provisions: 56, 90, 102

- PIN Number: UN1075

SECTION 10 - PREPARATION

Superior Propane Inc., Regulations & Safety Department. (403) 730-7500 Date prepared: November 2001.
Supersedes: September 1999

The information contained herein is believed to be accurate. It is provided independently of any sale of the product. It is not intended to constitute performance information concerning the product. No express warranty, implied warranty of merchantability or fitness for a particular purpose is made respect to the product information contained herein.

DIESEL FUEL		Page Number: 2	
Vapour Pressure	1.0 kPa @ 20°C (7.5 mmHg @ 68°F)	Dispersion Properties	Not available
Volatility	<0.1 (Butyl acetate = 1), less than gasoline.	Solubility	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Section 10. Stability and Reactivity			
Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	Decomposition Products	May release CO _x , NO _x , SO _x , H ₂ S, H ₂ O, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information	
Routes of Entry	Skin contact, eye contact, inhalation, and ingestion
Acute Lethality	Acute oral toxicity (LD50): 7500 mg/kg (rat).
Chronic or Other Toxic Effects:	
Dermal Route:	Skin contact may cause moderate to severe irritation. Repeated exposure would produce drying and cracking or defoliating dermatitis.
Inhalation Route:	Inhalation of vapours can cause CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Inhalation can also cause irritation of nose and throat.
Oral Route:	Aspiration of liquid drops into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure.
Eye Irritation/Inflammation:	Eye contact may cause mild irritation, but no permanent damage.
Immunotoxicity:	Not available
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	This product is not expected to be a mutagen, based on the available data and the known hazards of the components.
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	ACGIH Notice of Intended Change (2000): proposed A3: animal carcinogen, [Diesel oil]
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark.

Section 12. Ecological Information			
Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

DIESEL FUEL

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Fire Fighting
Media and
Instructions

NAERG98, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible).

CAUTION: This product has a moderate flash point above 40°C. Use of water spray when fighting fire may be inefficient.

If tank, rail car or tank truck is involved in a fire, ISO/LATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions.

SMALL FIRES: Dry chemical, CO₂, water spray or regular foam.

LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk.

Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6. Accidental Release Measures

Material Release
or Spill

NAERG98, GUIDE 128, Flammable Liquids (Non-polar/ Water-immiscible).

ELIMINATE ALL IGNITION SOURCES. Avoid contact. Stop leak if without risk. Contain spill. Absorb with inert absorbents, dry clay, or diatomaceous earth. Avoid inhaling dust of diatomaceous earth for it may contain silica in very fine particle size, making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.

Section 7. Handling and Storage

Handling

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk. DO NOT reuse empty containers without commercial cleaning or reconditioning. Ground/bond line and equipment during pumping or transfer to avoid accumulation of static charge. DO NOT ingest. Do not breathe gas/vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Avoid contact with skin and eyes. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.

Storage

Store in tightly closed containers in cool, dry, isolated, well-ventilated area, and away from incompatibilities. Ground all equipment containing material.

Section 8. Exposure Controls/Personal Protection

Engineering Controls

For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work station.

Personal Protection

The selection of personal protective equipment varies, depending upon conditions of use.

Eyes

Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.

Body

Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.

Respiratory

Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.

Hands

Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.

Feet

Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and
Appearance

Bright oily liquid.

Viscosity

1.3-4.1 cSt @ 40°C (104°F)

Colour

Clear to yellow / brown. Low sulphur diesel fuels (<0.05 wt % sulphur) are colourless to light yellow (and may be dyed red for taxation purposes). Regular sulphur diesel fuels (0.05-0.50 % sulphur) may be colourless to yellow / brown and are usually dyed red for taxation purposes.

Pour Point

Variable, 0°C to -50°C (32°F to -58°F)

Odour

Petroleum oil like.

Softening Point

Not applicable.

Odour Threshold

Not available

Dropping Point

Not applicable.

Boiling Point

150-371°C (302-700°F)

Penetration

Not applicable.

Density

0.85 kg/L @ 15°C (Water = 1).

Oil / Water Dist.
Coefficient

Not available

Vapour Density

4.5 (Air = 1)

Innity (in water)

Not applicable.

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Available in French



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-3, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	DIESEL FUEL	Code	W104 SAP: 120, 121, 122, 287
Synonym	Diesel 50, Diesel 50 LS, #1 Diesel, #1 Diesel LS, Diesel LC, Seasonal Diesel, Seasonal Diesel LS, Diesel AA, Domestic Marine Diesel, International marine Diesel, Seasonal Diesel Locomotive, Domestic Marine diesel LS, diesel -20°C (LS), LSD, Low Sulphur Diesel, dyed diesel, marked diesel, coloured diesel	Validated on	3/2/2001.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-298-3000 Canutec Transportation: 613-996-6466 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W)	TLV-TWA (8 h)	STEL	CEILING
1) Diesel oil, 2) Proprietary additives, 3) Aromatic content is 50% maximum (benzene: nil). 4) * Notice of Intended Change (2000): 100 mg/m ³ , skin, A3.	68334-30-5 Not available	>99.9 <0.1	Not established* Not established	Not established Not established	Not established Not established
Manufacturer	Not applicable				
Recommendation					
Other Exposure Limits Consult local, state, provincial or territory authorities for acceptable exposure limits.					

Section 3. Hazards Identification

Potential Health Effects	Eye contact may cause mild eye irritation. Skin contact can cause moderate to severe irritation and produce drying, cracking, or defatting dermatitis. Inhalation of vapours can cause CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Inhalation can also cause irritation of nose and throat. Aspiration of liquid drops into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure. For more information, refer to Section 11.
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Section 4. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available.

Section 5. Fire-fighting Measures

Flammability	Class II combustible liquid (NFPA).	Flammable Limits	LOWER: 0.7%, UPPER: 6%
Flash Points	Diesel Fuel: Closed Cup: >40°C (>104°F) Marine Diesel Fuel: Closed Cup: >60°C (>140°F)	Auto-Ignition Temperature	225°C (437°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, or heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container. Vapour explosion hazard indoors, outdoors or in sewers. Runoff to sewer may create fire or explosion hazard.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), sulphur compounds (H ₂ S), water vapour (H ₂ O), smoke and irritating vapours as products of incomplete combustion.		

DIESEL FUEL

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Section 13. Disposal Considerations

Waste Disposal Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.

Section 14. Transport Information

TDG Classification	Diesel Fuel UN1202 3 III	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

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

Please contact Product Safety for more information.

DSD/OPD (Europe)	Not evaluated.	HCS (U.S.A.)	CLASS: Irritating substance. CLASS: Target organ effects. CLASS: Combustible liquid having a flash point between 37.8°C (100°F) and 93.3°C (200°F).
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ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN	DOT (U.S.A.) (Pictograms)	
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HMIS (U.S.A.)	Health Hazard (2) Fire Hazard (2) Reactivity (0) Personal Protection (H)	NEPA (U.S.A.)	Health  Fire Hazard Reactivity Specific hazard	Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
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Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous Goods by Road (Europe)
ASTM - American Society for Testing and Materials
BOD5 - Biological Oxygen Demand in 5 days
CAN/CSA B149.2 - Pipeline Installation Code
CAS - Chemical Abstract Services
CEPA - Canadian Environmental Protection Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CFR - Code of Federal Regulations
CHIP - Chemicals Hazard Information and Packaging Approved Supply List
COD5 - Chemical Oxygen Demand in 5 days
CPR - Controlled Products Regulations
DOT - Department of Transport
DSCG - Dangerous Substances Classification and Labeling (Europe)
DSD/OPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
DSL - Domestic Substances List
EEC/EEU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazardous Communication System
WHMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System
LOSOI C50 - Lethal Dose/Concentration 50%
LD₅₀/LC₅₀ - Lowest Published Lethal Dose/Concentration
NAERGSR - North American Emergency Response Guide Book (1995)
NFPA - National Fire Protection Association
NIOSH - National Institute for Occupational Safety & Health
NPL - National Pollution Release Inventory
NSNR - New Substances Notification Regulations (Canada)
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reauthorization Act
SD - Single Dose
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TD₅₀/TC₅₀ - Lowest Published Toxic Dose/Concentration
TLm - Median Toxicity Limit
TLV-TWA - Threshold Limit Value-Time Weighted Average
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

Fuels & Solvents:
Western Canada, telephone: 403-296-4158; fax: 403-296-6551
Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1278
Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - PAR on 3/2/2001.

Data entry by Product Safety - DW.

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Available in French

DIESEL FUEL

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To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	SDG (pictograms)
	B-2, D-2A, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	JET B AVIATION TURBINE FUEL	Code	File # W219
Synonym	Jet B, Jet B DI, International Jet B, International Jet B DI, Jet Fuel JP-4, Jet Fuel F-40, Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22).	Validated on	3/3/1999.
Manufacturer	PETRO-CANADA P.O. Box 2841 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canadian Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Used as aviation turbine fuel. May contain a fuel system icing inhibitor.		

Section 2. Composition and Information on Ingredients

Name			Exposure Limits (ACGIH)		
	CAS #	% (V/V)	TLV-TWA (8 h)	STEL	CEILING
1) Complex mixture of aliphatic and aromatic hydrocarbons (C6-C14).	64741-41-9	>93	300 ppm (gasoline)	500 ppm (gasoline)	Not established
2) Proprietary additives.	Not applicable	<0.2	Not established	Not established	Not established
Manufacturer Recommendation	Petro-Canada recommends a working guideline no greater than 1 ppm (3.2 mg/m ³) of benzene for 8 hours time weighted average when handling product which may contain benzene; 300 ppm for 8 hours time weighted average and 500 ppm for short term exposure limit when handling Jet B. Consult local authorities for acceptable exposure limits.				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification

Potential Health Effects	Inhalation of vapours or mist may cause irritation of nose and throat; headache, nausea, vomiting, dizziness, fatigue, light-headedness, reduced coordination and unconsciousness; central nervous system depression; kidney and liver damage from long-term exposure. May be narcotic in high concentrations. Skin contact may cause drying, cracking, defatting, or inflammation of skin. Prolonged or repeated contact with skin may cause dermatitis. Eye contact may cause irritation, but no permanent damage. Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. Harmful or fatal if swallowed. For more information, refer to Section 11.
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Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. DO NOT use an eye ointment. Seek medical attention if irritation persists.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Get medical attention if redness or irritation occurs.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform mouth-to-mouth resuscitation. Administer oxygen if available. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	Gastric decontamination to prevent absorption is important following a substantial recent ingestion. Is most effective if initiated within 30 minutes. DO NOT induce vomiting without supervision of medical personnel, because of danger of aspirating liquid into lungs. Seek immediate medical attention.
Note to Physician	Aspiration into lungs may cause chemical pneumonitis. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonia. Monitor blood gases to assure adequate ventilation. If vital signs become abnormal or symptoms develop obtain a chest x-ray. Prevent further absorption by administer charcoal slurry, aqueous or mixed with saline cathartic or sorbitol. The FDA suggested 2.10 ml of diluent/30 g of charcoal. Usual charcoal dose is 30 to 100 g in adults, 15 to 30 g in children and 1 to 2 g/kg in infants.

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	Lower 1.3%; Upper 7.4% (NFPA).
Flash Points	Closed Cup: -25°C (-13°F), Tag, ASTM D56.	Auto-Ignition Temperature	340°C (644°F)
Continued on Next Page			

JFT B AVIATION TURBINE FUEL		Page Number: 2	
Fire Hazards in Presence of Various Substances	Easily ignites under almost all normal temperature conditions. Extremely flammable in presence of open flames, sparks, shocks, heat, oxidizing materials. Vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks), and may travel considerable distance to sources of ignition and flash back.	Explosion Hazards in Presence of Various Substances	Excessive heat. On hot cut, weld, heat, or drill empty container. Containers may explode in heat of fire. Runoff to sewer may create fire or explosion hazard.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), sulphur compounds (H ₂ S), smoke and irritating fumes as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 128, Flammable/combustible liquid (non-polar/water-immiscible). CAUTION: This product has a low flash point, use of water spray when fighting fire may be inefficient. SMALL FIRE: Use DRY chemicals, CO ₂ , water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. DO NOT extinguish a leaking gas flame unless leak can be stopped. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. Avoid flushing spilled material into sewers, streams or other bodies of water. Self-contained breathing apparatus (SCBA) will be required if approaching the fire from downwind, or to enter enclosed areas or buildings.		

Section 6. Accidental Release Measures

Material Release or Spill	NAERG96, GUIDE 128, Flammable/combustible liquid (non-polar/water-immiscible). Evacuate in a downwind direction for at least 300 meters (1000 feet). ELIMINATE ALL IGNITION SOURCES. Ventilate closed spaces before entering. By forced ventilation, maintain concentration of vapour below the range of explosive mixture. Avoid contact, fully-encapsulating, vapour-protective clothing should be worn for spills and leaks with no fire. Stop leak if without risk. Remove the leaking container to an open area and allow it to bleed off into the atmosphere. Use vapour suppressing foam or water spray to reduce vapours; it may reduce vapour, but it may not prevent ignition in closed spaces; isolate area until vapour has dispersed. Contain spill. Absorb with inert absorbents such as dry clay, or diatomaceous earth, or recover using electrically grounded explosion-proof pumps. Avoid inhaling dust of diatomaceous earth for it may contain silica in very fine particle size, making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Keep away from sources of ignition. In case of insufficient ventilation, wear suitable respiratory equipment. HANDLE AS EXTREMELY FLAMMABLE LIQUID. Electrically ground/bond during the pumping or transfer to avoid static accumulation. DO NOT USE AS CLEANING FLUID OR SIPHON BY MOUTH. Precautions should be taken to minimize skin contact and inhalation. High standards of personal hygiene are necessary. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Combustible materials should be stored away from extreme heat and away from strong oxidizing agents. Store in tightly closed containers in cool, dry, isolated and well-ventilated area. Ground all equipments containing material.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal outdoor application, special ventilation is not necessary. For indoor or confined spaces provide explosion-proof local exhaust ventilation, or other engineer controls, to keep airborne concentration below the allowable threshold limit value. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work station.
Personal Protection -	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Face shield or chemical splash goggles in case of splashing.
Body	Wear long sleeved clothing to minimize skin contact.
Respiratory	When exposure is likely to exceed recommended exposure limit (see section 2), use NIOSH approved respiratory equipment. Respirator should be selected based on the form and concentration of contaminant in air (refer to NIOSH Pocket Guide for Chemical Hazard for respirator selection). In order to determine the concentration of the contaminant, air sampling is RECOMMENDED AND SHOULD BE PERFORMED BY A HEALTH & SAFETY SPECIALIST (AS PER THE NIOSH Manual of analytical Methods for method of measurement). If air sampling is not practical and concentration is unknown, use positive pressure self-contained breathing apparatus (SCBA). Contact appropriate HEALTH & SAFETY personnel or supplier for assistance.
Hands	For casual contact, polyvinyl alcohol (PVA) gloves are suitable. For direct contact for more than 2 hours, nitrile or viton gloves are recommended.
Feet	Safety boots or shoes.

JL10 AVIATION TURBINE FUEL

Page Number: 3

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear liquid.	Viscosity	Not available.
Colour	Clear and colorless.	Pour Point	Freezing Point: <54°C (<80°F) for Jet B/Jet B-DI; <58°C (<72°F) for Jet Fuel F-40.
Odour	Gasoline like.	Softening Point	Not applicable.
Odour Threshold	Not available.	Dropping Point	Not applicable.
Boiling Point	50 to 270°C (122 to 518°F)	Penetration	Not applicable.
Density	0.75 to 0.80 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not measurable. The product is more soluble in oil.
Vapour Density	3.5 (Air = 1)	Ionicity (In water)	Insoluble in water.
Vapour Pressure	21 kPa (158 mmHg) @ 37.8°C (100°F).	Dispersion Properties	Not dispersed in cold water, or hot water.
Volatility	Volatile.	Solubility	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Section 10. Stability and Reactivity

Corrosivity	Non corrosive.		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Can react with strong organic oxidizing agents.	Decomposition Products	Releases of CO ₂ , NO _x , O ₂ , H ₂ S, smoke and irritating fumes when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, Inhalation and ingestion.
Acute Lethality	Based on toxicity of gasoline, acute oral toxicity (LD50): 18750 mg/kg (rat).
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact can defat the skin, cause irritation, and lead to the development of dermatitis. Prolonged skin contact has same effects as inhalation. Injures blood-forming tissue on contact.
Inhalation Route:	Exposure to light hydrocarbons has been associated in animal studies with effects to the central nervous system, peripheral nervous system, liver, and kidneys. The significance of these animal models to predict similar human response is uncertain. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood forming system (particularly bone marrow), and serious blood disorders, such as aplastic anemia and leukemia.
Oral Route:	Aspiration of liquid drops into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure.
Eye Irritation/Inflammation:	May irritate the eyes.
Immunotoxicity:	Benzene-Hematologic and immunochemical investigations carried out in 270 workers with chronic exposure to benzene demonstrated changes of the nucleologram and of the count of lymphocyte nuclei and disorders of the humoral immune response revealed by radial immunodiffusion.
Skin Sensitization:	No studies were found.
Respiratory Tract Sensitization:	No studies were found.
Mutagenic:	Benzene is tumorigenic by RTECS criteria.
Reproductive Toxicity:	Based on the available animal data for benzene, Dose: 150 ppm (rat/inhalation/24h/7-14 days of pregnancy) - abnormal development of the musculoskeletal system.
Teratogenicity/Embryotoxicity:	Based on the available animal data, benzene poses a developmental or teratogenicity risk to rats.
Carcinogenicity (ACGIH):	ACGIH A1: confirmed human carcinogen, based on toxicity of benzene.
Carcinogenicity (IARC):	IARC Group 1: carcinogenic to Humans, based on toxicity of benzene.
Carcinogenicity (NTP):	NTP Group 1: known to be a carcinogen, based on toxicity of benzene.
Carcinogenicity (IRIS):	No studies were found.
Carcinogenicity (OSHA):	OSHA Group X: carcinogen defined with no further categorization, based on toxicity of benzene.
Other Considerations	Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood forming system (particularly bone marrow), and serious blood disorders, such as aplastic anemia and leukemia. The epidemiologic literature on benzene and leukemia supports the inference that benzene causes acute myelocytic leukemia.

Continued on Next Page

Available

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Section 12. Ecological Information			
Environmental Fate	Volatilizes and disperses rapidly. Volatilization is expected to be the dominant fate process. Biodegrade under both aerobic and anaerobic conditions.	Persistence/ Bioaccumulation Potential	Floats on water. May be dangerous to aquatic life in high concentrations.
BOD5 and COD	Not available.	Products of Biodegradation	Not available.
Additional Remarks	If released to soil, fuel oil will strongly adsorb. It may biodegrade in water and soil or volatilize from water (half-life of 4.4 to 4.8 hrs from a model run) and moist soil surfaces, but adsorption may moderate the rate of these processes.		

Section 13. Disposal Considerations	
Waste Disposal	Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.

Section 14. Transport Information	
TDG Classification	Shipping Name: Fuel, aviation, turbine engine; UN 1863; Class: 3; Packing Group: II; Label required: Flammable liquid.
Special Provisions for Transport	No additional remark.

Section 15. Regulatory Information											
Other Regulations:	CEPA: This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on DSL. This product may contain trace benzene, a carcinogen, which is listed on NPRI. USEPA: All components of this formulation are listed on TSCA Inventory. This product may contain trace benzene, a carcinogen, which is required to be listed under OSHA hazard communication standard, 29 CFR 1910.1200 (U.S.). Listed on New Jersey Environmental Hazardous Substance List. Benzene is listed on EPCRA or SARA Title III, Section 302/304/311/312 (40 CFR 355/370) for Extremely Hazardous Substances. Benzene is listed on EPCRA or SARA Title III, Section 313 (40 CFR 372) for Toxic Chemicals. Benzene is listed on CERCLA Hazardous Substances (RC Chemicals) (40 CFR 302.4). Benzene is listed on RCRA (40 CFR 261.33) for Hazardous Waste. Please note that the chemical identity of some or all of the ingredients that may be listed herein is confidential business information and is being withheld as permitted by 29 CFR 1910.1200 and various State Right to Know Laws.										
DSD/DPD (Europe)	5- Heating may cause an explosion. 12- Extremely flammable. 18- In use, may form flammable/explosive vapor-air mixture. 36/37/38- Irritating in eyes, respiratory system and skin. 40- Possible risks of irreversible effects.	HCS (U.S.A.)	HCS CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F). HCS CLASS: Irritating substance. HCS CLASS: Toxic.								
ADR (Europe) (Pictograms)		DOT (U.S.A.) (Pictograms)									
HMIS (U.S.A.)	<table><tr><td>Health Hazard</td><td>1</td></tr><tr><td>Fire Hazard</td><td>3</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>h</td></tr></table>	Health Hazard	1	Fire Hazard	3	Reactivity	0	Personal Protection	h	NFPA (U.S.A.) Health  Fire Hazard Reactivity Specific Hazards	Rating 0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
Health Hazard	1										
Fire Hazard	3										
Reactivity	0										
Personal Protection	h										

Section 16. Other Information	
References	Available upon request.
Glossary ACGIH - American Conference of Governmental Industrial Hygienists ADR - Agreement on Dangerous Goods by Road (Europe) ASTM - American Society for Testing and Materials BOD5 - Biological Oxygen Demand in 5 days CAN/CEC B149.2 - Flammable Liquid Classification Code CAS - Chemical Abstract Services CEPA - Canadian Environmental Protection Act CERCLA - Comprehensive Environmental Response, Compensation and Liability Act CFR - Code of Federal Regulations CHIP - Chemical Hazard Information and Packaging Approved Supply List COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe) DSL - Domestic Substance List EEC/ECU - European Economic Community/European Union EINECS - European Inventory of Existing Commercial Chemical Substances EPCRA - Emergency Planning and Community Right to Know Act IRIS - Integrated Risk Information System LD50/CL50 - Lethal Dose/Concentration 50% LDLo/CLLo - Lowest Published Lethal Dose/Concentration NAERG-91 - North American Emergency Response Guide Book (1996) NFPA - National Fire Protection Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant Release Inventory NSNR - New Substances Notification Regulations (Canada) NTF - National Toxicology Program OSHA - Occupational Safety & Health Administration PEL - Permissible Exposure Limit RCRA - Resource Conservation and Recovery Act SARA - Superfund Amendments and Reorganization Act SL - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TLV-TCLo - Lowest Published Toxic Dose/Concentration TLV - Tolerable Limit TLV-TWA - Threshold Limit Value-Time Weighted Average	

JET B AVIATION TURBINE FUEL		Page Number 5
FDA - Food and Drug Administration FIFRA - Federal Insecticide, Fungicide and Rodenticide Act HCS - Hazardous Communication System HMIS - Hazardous Material Information System IARC - International Agency for Research on Cancer		TCGA - Toxic Substances Control Act USEPA - United States Environmental Protection Agency USP - United States Pharmacopoeia WHIMIS - Workplace Hazardous Material Information System
For Copy of MSDS Western Canada, telephone: 403-296-7694; fax: 403-296-3763 Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228 Quebec & Eastern Canada, telephone: 514-640-8396; fax: 514-640-8373		Prepared by Product Safety - TLR on 3/8/1999, Data entry by Product Safety - TLR.
<i>To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.</i>		

Esso

MATERIAL SAFETY DATA SHEET

Date Prepared: November 03, 1994
Supersedes: April 11, 1994
MSDS Number: 000108

may be dyed a variety of colours for tax or other purposes, petroleum odour

Cette fiche signalétique est aussi disponible en français

1. PRODUCT INFORMATION

Product Identifier: UNLEADED GASOLINE (DYED OR CLEAR)
ESSO EXTRA MIDGRADE GASOLINE
ESSO EXTRA MIDGRADE UNLEADED
ESSO MIDGRADE UNLEADED
ESSO PREMIUM UNLEADED
ESSO REGULAR UNLEADED
ESSO SUPER PREMIUM UNLEADED
ESSO SUPREME PREMIUM UNLEADED
ESSO SUPREME 92 PREMIUM UNLEADED
ESSO UNLEADED (REGULAR)
EXXON MIDGRADE UNLEADED
EXXON PREMIUM UNLEADED
EXXON REGULAR UNLEADED
INDOLENE GASOLINE
MIDGRADE GASOLINE
MIDGRADE UNLEADED
PREMIER GASOLINE
PREMIUM UNLEADED
REGULAR UNLEADED

Application and Use
Unleaded fuel for spark ignited engines. The product name will include "DYED" if the product is dyed for tax purposes.

Product Description

A mixture of aliphatic and aromatic hydrocarbons and additives.

REGULATORY CLASSIFICATION

WHMIS:

Class D, Division 2, Subdivision A: Very Toxic Material,
Class B, Division 2: Flammable Liquids.

TRANSPORTATION OF DANGEROUS GOODS INFORMATION

Shipping Name: Gasoline
Class: Flammable Liquid 3.1
PIN Number: UN1203
Packing Group: II
Guide Number: 119

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr: (519) 339-2145
Technical Info: (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4111

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Gasoline	> 99 v/v	8006-61-9
Methyl T-Butyl Ether	0-11 v/v	1634-04-4

LD50 > 18 ml/kg, oral, rat
LD50 > 5 ml/kg, skin, rat
LD50: 3.9g/kg, ing, rat
LD50: > 10g/kg, skin, rat
LC50: 142 mg/L, inh, rat

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
Specific gravity: not available
Viscosity: 0.80 cSt at 20 deg C
Vapour Density: 3.2
Boiling Point: 25 to 210 deg C
Evaporation rate: > 10 (1 = n-butylacetate)
Solubility in water: negligible
Freezing/Pour Point: -60 deg C less than
Odour Threshold: not available
Vapour Pressure: 76 kPa to 103 kPa at 38 deg C
Density: 0.73 g/cc at 15 deg C
Appearance/odour: Naturally occurring water white or pale yellow

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

High vapour concentrations are irritating to the eyes, nose, throat and lungs; may cause headaches and dizziness; may be anesthetic and may cause other central nervous system effects.
Avoid breathing vapours or mists.
Contains small amounts of methylcyclopentadienyl manganese tricarbonyl (MMT), benzene and n-hexane. MMT may cause nervous system, liver and kidney effects. Benzene may cause blood and/or the blood producing system disorder and/or damage; n-hexane may cause peripheral (e.g. fingers, feet, arms etc.) nerve damage. In high concentrations gasoline components may cause central nervous system disorders.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
Frequent or prolonged contact may irritate the skin and cause a skin rash (dermatitis).

INGESTION:

Low toxicity.
Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

CHRONIC:

The International Agency for Research on Cancer (IARC) has evaluated gasoline and found it to be a possible human carcinogen.
Contains benzene. Human health studies (epidemiology) indicate that prolonged and/or repeated overexposures to benzene may cause damage to the blood producing system and serious blood disorders, including leukemia.
Animal tests suggest that prolonged and/or repeated overexposures to benzene may damage the embryo/fetus. The relationship of these animal studies to humans has not been fully established.
Contains n-hexane. Prolonged and/or repeated exposures may cause damage to the peripheral nervous system (e.g. fingers, feet, arms etc.).

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:
Oral: LD50 > 18 ml/kg (Rat)
Dermal: LD50 > 5 ml/kg (Rabbit)

OCCUPATIONAL EXPOSURE LIMIT:

Manufacturer recommends:
For gasoline, 100 ppm (300 mg/m3).
For Benzene (skin) 1) 5 ppm TWA for 8 hrs/day 2) 3 ppm TWA for 12 hrs/day 3) 250 ppm, minutes for 5 to 30 minutes.
For Methyl-tert-butyl ether, a 15 minute short-term exposure limit (STEL) of 50 ppm.

ACGIH recommends:

For Gasoline, 300 ppm (900 mg/m3).
For n-Hexane, 50 ppm (180 mg/m3).
For Benzene, the ACGIH recommends a TLV of 10 ppm (30 mg/m3), and describes it as a substance of suspect carcinogenic potential in man.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In emergency situations use proper respiratory protection to immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

Please turn over

IMPERIAL OIL

Products Division

UNLEADED GASOLINE (DYED OR CLEAR)

Date Prepared: October 31, 1995
Supersedes: April 4, 1994
MSDS Number: 360040

Cette fiche signalétique est aussi disponible en français

1. PRODUCT INFORMATION

Product Identifier: ESSO HD ANTIFREEZE (GM6038M)

Application and Use:
Engine antifreeze coolant

Product Description:

A glycol type antifreeze

REGULATORY CLASSIFICATION

WHMIS:

Class D, Division 2, Subdivision A: Very Toxic Material.

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT

All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TRANSPORTATION OF DANGEROUS GOODS INFORMATION

Shipping Name: Compounds, Anti-Freeze

Class: Not regulated

Packing Group: Not regulated

RIN Number: Not regulated

Guide Number: 134

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr: (519) 339-2145
Technical Info: (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4111

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #	LD50: 8.5g/kg, oral, rat	LD50: 19g/kg, skin, rabbit
Monoethylene Glycol	80-90 w/w	107-21-1		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
Specific Gravity: not available
Viscosity: > 19.10 cSt at 20 deg C
Vapour Density: not available
Boiling Point: 166 deg C
Evaporation Rate: < 1 (1 = n-butylacetate)
Solubility in water: 100.00%
Freezing/Pour Point: not available
pH: 11.0
Odour Threshold: not available
Vapour Pressure: < 1 kPa at 38 deg C
Density: 1.11 g/cc at 16 deg C
Appearance/odour: A green coloured liquid, with a sweet smell.

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
High vapour concentrations are irritating to the eyes, nose, throat and lungs; may cause headaches and dizziness; may be anesthetic and may cause other central nervous system effects.
Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity
Frequent or prolonged contact may irritate the skin

INGESTION:

Moderately toxic

CHRONIC:

Contains ethylene glycol (EG). Repeated high dose exposure to EG by ingestion (animal studies) has caused kidney damage, brain damage, degeneration of the liver, changes in blood chemistry and circulating blood cells. Prolonged and/or repeated exposures may cause similar effects in humans.
Ethylene glycol has been shown to cause developmental and reproductive effects at high dose levels in laboratory animals. The relationship of these results to humans has not been fully established.

This product contains Diethylene Glycol (DEG). Prolonged and repeated exposure through ingestion of DEG may result in toxic effects on the kidney.

ACUTE TOXICITY DATA:

Based on animal and human testing data from similar materials and products, the acute toxicity of this product is expected to be:
Oral: LD50 > 1300 mg/kg (human)
LD50 > 8500 mg/kg (rat)

OCCUPATIONAL EXPOSURE LIMIT:

Manufacturer recommends:
For diethylene glycol, the Supplier recommends an exposure limit of 10 mg/m³ (aerosol) and 50 ppm (total), based upon the AHA WEEL.

ACGIH recommends:

For Ethylene Glycol aerosol, a ceiling limit of 39.4 ppm (100 mg/m³).

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In emergency situations use proper respiratory protection to immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available.
Remove severely contaminated clothing (including shoes) and launder before reuse.
If irritation persists, seek medical attention.

INGESTION:

If swallowed, induce vomiting only if victim is conscious.
Get prompt medical attention. DO NOT attempt to give anything by mouth to an unconscious person.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.
In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves.
Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided.
Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

Please turn over

Material Safety Data / Fiche signalétique

WESTCOAST DRILLING SUPPLIES LTD.

8068 River Way, Delta, British Columbia,
Canada V4C 1L3
Ph. (604) 940-6050 Fax (604) 940-6080

EMERGENCY 1-800-665-6645

SECTION I: IDENTIFICATION OF PRODUCT

PRODUCT NAME: **DR-133 POLYMER**
PRODUCT USE: **Drilling Mud Additive**
CHEMICAL FAMILY: **Copolymer of Acrylamide with Sodium Acrylate**
WHMIS CLASSIFICATION: **B-3, D-2B**
WORK PLACE HAZARD: **Combustible liquid, Toxic material**

(TDG TRANSPORTATION OF DANGEROUS GOODS)

TDG CLASSIFICATION: **Not regulated by TDG**

SECTION II: HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NUMBER	LD ₅₀ (oral rat)	LD ₅₀ (Dermal rabbit)
Mineral Spirits	20-40	64742-47-8	>5 g/kg	>3 g/kg
Alkyl phenol ethoxylate	3-7	68412-54-4	3000 mg/kg	4400 mg/kg
Ethoxylated C12-15 Alcohol	1-5	68131-39-5	>3200 mg/kg	>2000 mg/kg

SECTION III: HEALTH HAZARDS

ROUTE OF ENTRY: [XXX] Skin XXX] Eye Contact [] Inhalation [XXX] INGESTION

SKIN CONTACT: Contact can cause irritation, redness, swelling or dermatitis.
EYE CONTACT: Will cause painful burning or stinging of eyes and lids, watering of eyes, and inflammation of conjunctiva.
INHALATION: Not available.
INGESTION: May cause nausea, diarrhea, abdominal cramps and vomiting.
EFFECTS OF CHRONIC EXPOSURE: Skin irritation or dermatitis may occur upon frequent or prolonged exposure.

SECTION IV: FIRST AID MEASURES

SKIN CONTACT: In case of skin contact, immediately flush contacted area for at least 15 minutes with water.
Remove contaminated clothing immediately and launder before reuse.
If irritation develops consult a doctor.
EYE CONTACT: In case of contact with eyes, flush with water for at least 15 minutes.
Seek immediate medical attention.
INHALATION: Remove to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult give oxygen.
Seek medical attention.
INGESTION: If victim is conscious, give water.
Do not induce vomiting.
Seek immediate medical attention

Material Safety Data / Fiche signalétique

WESTCOAST DRILLING SUPPLIES LTD.

8069 River Way, Delta, British Columbia,
Canada V4G 1L3
Ph. (604) 940-6050 Fax (604) 940-6080

EMERGENCY 1-800-865-6645

DR-133 POLYMER

Page 2 of 3

SECTION V: PHYSICAL DATA

APPEARANCE AND ODOR	: Liquid emulsion
SPECIFIC GRAVITY	: Not available
BOILING POINT (°C)	: Not available
MELTING POINT (°C)	: Not available
SOLUBILITY IN WATER	: Soluble
pH	: 7.0 - 9.0 (0.6% in D.W.)
PERCENT VOLATILE BY VOLUME	: Not available
EVAPORATION RATE	: Not available
VAPOR PRESSURE (mm Hg)	: Not available
VAPOR DENSITY (Air = 1)	: Not available

SECTION VI: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (°C):	: 70°C
FLAMMABLE LIMITS:	: Not available
EXTINGUISHING MEDIA	: Water, dry chemical, foam, carbon dioxide, Water will cause extreme slipperiness.
SPECIAL FIRE FIGHTING PROCEDURES	: Self-contained respirators required for fire fighting personnel.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	: sensitivity to static discharge.

SECTION VII: REACTIVITY DATA

STABILITY:	Stable [XXX]	Unstable []
INCOMPATIBILITY (MATERIALS TO AVOID):	Strong oxidizing agents and reducing agents.	
HAZARDOUS DECOMPOSITION PRODUCTS :	Not available	
HAZARDOUS POLYMERIZATION	Will not occur [XXX]	May occur []

Material Safety Data / Fiche signalétique

WESTCOAST DRILLING SUPPLIES LTD.
8069 River Way, Delta, British Columbia,
Canada V4G 1L3
Ph. (604) 940-6050 Fax (604) 940-6080

EMERGENCY 1-800-665-8645

DR-133 POLYMER

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SECTION VIII: PREVENTIVE MEASURES

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	In absence of proper ventilation, recommend approved organic vapor-type respirator.
VENTILATION:	10 changes per hour suggested.
PROTECTIVE GLOVES:	Suggest plastic or rubber
EYE PROTECTION:	Goggles
OTHER PROTECTIVE EQUIPMENT (Specify):	Suggest rubber apron

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use.
Store in a cool and dry location away from oxidizing and reducing agents.

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED

Eliminate sources of ignition.
Collect into waste container.
Absorb remaining product with earth or sand and dispose of with solid waste.
Wash spill site after material pickup.
Do not breath vapours.
Water will cause extreme slipperiness.
Use NIOSH approved respirator if exposed to vapours.

WASTE DISPOSAL METHOD

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material.
Consult appropriate federal, state and local regulatory agencies to ascertain proper disposal procedures.

SECTION IX: PREPARATION

The information contained herein is given in good faith, but no warranty, expressed or implied, is made.

SUPERSEDES: October 29, 1993
DATE ISSUED: April 1, 2000

DATE REVISED: June, 2000

BY: Product Safety Committee

Material Safety Data / Fiche signalétique

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SECTION I: IDENTIFICATION OF PRODUCT

PRODUCT NAME: **550X® POLYMER**

CHEMICAL FAMILY: Anionic water soluble polymer

PRODUCT USE: Drilling mud additive

WHMIS CLASSIFICATION: Not WHMIS regulated

TRANSPORTATION OF DANGEROUS GOODS (TDGR)

CLASSIFICATION: Not applicable

PACKAGE GROUP: Not applicable

UN NUMBER (PIN): Not applicable

SECTION II: HAZARDOUS INGREDIENTS

INGREDIENT	PERCENTAGE	CAS NUMBER	LD50	LC50
Copolymer of Acrylamide and Sodium Acrylate		25085-02-3		
Acrylamide	0.1000	79-06-1		

SECTION III: HEALTH HAZARDS

ROUTES OF ENTRY

[XXX] Skin [XXX] Eye Contact [XXX] Inhalation [XXX] Ingestion

THRESHOLD LIMIT VALUE: Not determined

SKIN CONTACT: No effects of exposure expected due to contact. Prolonged contact may cause slight skin irritation or dermatitis in some individuals.

EYE CONTACT: No effects of exposure expected with the exception of mechanical irritation.

INGESTION: No adverse effects expected.

INHALATION: Product may swell in throat causing choking. May cause sneezing, slight irritation of nose and throat.

SECTION IV: FIRST AID MEASURES

SKIN CONTACT: Wash with soap and water as a precaution. In case of persistent skin irritation, consult a physician.

EYE CONTACT: Rinse thoroughly with plenty of water, also under the eyelid. In case of persistent eye irritation, consult a physician.

INGESTION: The product is not considered toxic based on studies on laboratory animals. Do not induce vomiting, give 2-3 glasses of water.

INHALATION: Move to fresh air. If not breathing give artificial respiration. Seek medical attention.

Material Safety Data / Fiche signalétique

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550X® POLYMER

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SECTION V: PHYSICAL DATA

APPEARANCE	White granular solid
ODOR	None
SPECIFIC GRAVITY	0.8 at 25° C (77 F)
BOILING POINT (°C)	Not applicable
MELTING POINT (°C)	Not determined
SOLUBILITY IN WATER	Forms a gel
PERCENT VOLATILE BY VOLUME	Not determined
EVAPORATION RATE	Not determined
VAPOR PRESSURE (mm Hg)	Not determined
VAPOR DENSITY (Air=1)	Not determined
pH	4 - 9 @ 5g/L

SECTION VI: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	93° C (200 F)
FLAMMABLE LIMITS	Not determined
EXTINGUISHING MEDIA	Dry Chemical, Carbon Dioxide
SPECIAL FIRE FIGHTING PROCEDURES	Aqueous solutions or powders that become wet render surfaces extremely slippery.
UNUSUAL FIRE AND EXPLOSION HAZARDS	No special equipment required.

SECTION VII: REACTIVITY DATA

STABILITY	[XXX] Stable [] Unstable
INCOMPATIBILITY (Conditions to avoid)	Oxidizing agents
CONDITIONS OF REACTIVITY	Not known
HAZARDOUS DECOMPOSITION PRODUCTS	NO _x , CO _x
HAZARDOUS POLYMERIZATION	[XXX] Will not occur [] May occur

Material Safety Data / Fiche signalétique

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EMERGENCY 1-800-665-6645

550X® POLYMER

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SECTION VIII: PREVENTIVE MEASURES

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Dust masks are recommended where concentration of total dust is more than 10 mg/m ³
VENTILATION	General mechanical
PROTECTIVE GLOVES	Chemically resistant
EYE PROTECTION	Safety glasses with side shields
OTHER PROTECTIVE EQUIPMENT (Specify)	Not known

ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE THE MATERIAL IS SPILLED OR RELEASED

Do not flush with water. Clean up promptly by sweeping or vacuum.
Keep in suitable and closed containers for disposal.
After cleaning, flush away trace with water.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Avoid contact with skin and eyes. Avoid dust formation. Do not breathe dust. Wash hands before breaks and at the end of the day. Keep in a cool dry place (0 - 30 °C)

WASTE DISPOSAL METHOD

Can be land filled or incinerated, when in compliance with local, provincial and federal regulations.

SECTION IX: TOXICOLOGICAL INFORMATION

CARCINOGENICITY	Not determined
REPRODUCTIVE TOXICITY	Not determined
TERATOGENICITY	Not determined
MUTAGENICITY	Not determined
DEVELOPMENTAL TOXICITY	Not determined
CHRONIC EFFECTS:	This product does not contain any ingredient designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

Material Safety Data / Fiche signalétique

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EMERGENCY 1-800-885-8645

550X POLYMER

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SECTION X: PREPARATION

The information contained herein is given in good faith, but no warranty, expressed or implied is made.

DATE ISSUED: August, 2001

DATE REVISED: August, 1998

BY: Product Safety Committees

AMENDMENT HAZARDOUS INGREDIENTS (550X)

Material or component	WT% Hazard data
COPOLYACRYLAMIDE/SODIUM ACRYLATE	Not considered hazardous

ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY:	Not determined
OCTANOL/WATER PARTITION COEFFICIENT	Not determined
WASTE DISPOSAL METHODS:	Incineration and/or disposal in Chemical Landfill. Disposer must comply with federal, provincial and local disposal or discharge laws.
RCRA STATUS OF UNUSED MATERIAL IF DISCARDED:	Not a "Hazardous Waste"
HAZARDOUS WASTE NUMBER:	Not available
REPORTABLE QUANTITY:	EPA 40 CFR (CERCLA 102): Not applicable
THRESHOLD PLANNING QUANTITY:	EPA 40 CFR 355 (SERA 301-304): Not applicable
TOXIC CHEMICAL RELEASE REPORTING:	EPA 40 CFR 372 (SERA 311-313): Not applicable
EPA HAZARD CLASSIFICATION CODE:	ACUTE - Yes FIRE - No CHRONIC - No PRESSURE - No REACTIVE - No
HMIS AND NFPA RATINGS:	HMIS HEALTH 1 FLAMMABILITY 0 REACTIVITY 1 SPECIAL Not applicable
	NFPA HEALTH 1 FLAMMABILITY 0 REACTIVITY 1 SPECIAL Not applicable

I. PRODUCT IDENTIFICATION

MANUFACTURER

Exide Corporation
P.O. Box 14205
Reading, PA 19612-4205

CHEMICAL/TRADE NAME (as used on label)

Lead-Acid Battery

CHEMICAL FAMILY/ CLASSIFICATION

Electric Storage Battery

FOR INFORMATION

(610) 378-0500
Environmental Resources Dept.

DATE REVISED:

Page 1 of 7

FOR EMERGENCY

CHEMTREC (800) 424-9300
24-hour Emergency Response Contact
Ask for Environmental Coordinator

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

		Approximate Air Exposure Limits (ug/m ³)			
Components	CAS Number	% by Wt.	OSHA	ACGIH	NIOSH
Inorganic compounds of:					
Lead	7439-92-1	53	50	150	100
Antimony	7440-36-0	0.2	500	500	--
Arsenic	7440-38-2	0.003	10	200	--
Calcium	7440-70-2	0.02	--	--	--
Tin	7440-31-5	0.06	2000	2000	--
Electrolyte (sulfuric acid/water/solution)	7664-93-9	30-40	1000	1000	100
Case Material:					
Polypropylene	9003-07-0	5-6	N/A	N/A	N/A
Hard Rubber	--				
Other:					
Silicon dioxide (gel cell batteries only)	60676-86-0	3-5	N/A	N/A	N/A

NOTE: Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery manufactured by Exide Corporation or its subsidiaries. Other ingredients may be present dependent upon battery type. Polypropylene is the principal case material of automotive and commercial batteries.

III. PHYSICAL DATA - ELECTROLYTE

Boiling Point	203°F-240°F (for S.G. range)	Specific Gravity (H ₂ O=1)	1.230 to 1.350
Melting Point	Not Applicable	Vapor Pressure (mm Hg) 77°F	17 to 11 (for S.G. range)
Solubility In Water	100%	Vapor Density (AIR=1)	Greater than 1
Evaporation Rate (Butyl acetate=1)	Less Than 1	% Volatiles by Weight	Not Applicable
Appearance and Odor	A clear liquid with a sharp, penetrating, pungent odor. A battery is a manufactured article; no apparent odor.		

IV. FIRE AND EXPLOSION HAZARD DATA

PAGE 2 OF 7

Flash Point: Not Applicable

Flammable Limits: LEL = 4.1% (Hydrogen Gas in air)
UEL = 74.2%Extinguishing media: CO₂; foam; dry chemical

Special Fire Fighting Procedures: Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but, note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.

Unusual Fire and Explosion hazards: In operation, batteries generate and release flammable hydrogen gas. They must always be assumed to contain this gas which, if ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery.

V. REACTIVITY DATA

Stability: Stable X
Unstable

Conditions to Avoid: Prolonged overcharge at high current; sources of ignition.

Incompatibility: (materials to avoid)

Electrolyte (Water and Sulfuric Acid Solution): Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Lead compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen and reducing agents.

Hazardous Decomposition Products:

Electrolyte (Water and Sulfuric Acid Solution): Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen.

Lead compounds: Temperatures above the melting point are likely to produce toxic metal fume, vapor or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

VI. HEALTH HAZARD DATA

Routes of Entry:

Electrolyte (Water and Sulfuric Acid Solution): Harmful by all routes of entry.

Lead compounds: Hazardous exposure can occur only when product is heated above the melting point, oxidized or otherwise processed or damaged to create dust, vapor or fume.

Inhalation:

Electrolyte (Water and Sulfuric Acid Solution): Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Lead compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion:

Electrolyte (Water and Sulfuric Acid Solution): May cause severe irritation of mouth, throat, esophagus and stomach.

Lead compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity.

Skin Contact:

Electrolyte (Water and Sulfuric Acid Solution): Severe irritation, burns and ulceration.

Lead compounds: Not absorbed through the skin.

Eye Contact:

Electrolyte (Water and Sulfuric Acid Solution): Severe irritation, burns, cornea damage, blindness.

Lead compounds: May cause eye irritation.

Effects of Overexposure - Acute:

Electrolyte (Water and Sulfuric Acid Solution): Severe skin irritation, damage to cornea may cause blindness, upper respiratory irritation.

Lead compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

Effects of Overexposure - Chronic:

Electrolyte (Water and Sulfuric Acid Solution): Possible erosion of tooth enamel; inflammation of nose, throat and bronchial tubes.

Lead compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in both males and females.

Carcinogenicity:

Electrolyte (Water and Sulfuric Acid Solution): The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to sulfuric acid solutions in static liquid state or to electrolyte in batteries. Batteries subjected to abusive charging at excessively high currents for prolonged periods of time without vent caps in place may create a surrounding atmosphere of the offensive strong inorganic acid mist containing sulfuric acid.

Lead compounds: Listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

Arsenic: Listed by National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.

Medical Conditions Generally Aggravated by Exposure:

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of electrolyte (water and sulfuric acid solution) with skin may aggravate skin diseases such as eczema and contact dermatitis. Contact of electrolyte (water and sulfuric acid solution) with eyes may damage cornea and/or cause blindness. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

Emergency and First Aid Procedures:

Inhalation:

Electrolyte (Water and Sulfuric Acid Solution): Remove to fresh air immediately. If breathing is difficult, give oxygen.

Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

Ingestion:

Electrolyte (Water and Sulfuric Acid Solution): Give large quantities of water; do not induce vomiting; consult physician.

Lead: Consult physician immediately.

Skin:

Electrolyte (Water and Sulfuric Acid Solution): Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes.

Lead: Wash immediately with soap and water.

Eyes:

Electrolyte (Water and Sulfuric Acid Solution) and lead: Flush immediately with large amounts of water for at least 15 minutes; consult physician immediately.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storage:

Store batteries under roof in cool, dry, well-ventilated areas which are separated from incompatible materials and from activities which may create flames, sparks or heat. Store on smooth, impervious surfaces which are provided with measures for liquid containment in the event of electrolyte spills. Keep away from metallic objects which could bridge the terminals on a battery and create a dangerous short-circuit. Handle carefully and avoid tipping, which may allow electrolyte leakage. Single batteries pose no risk of electric shock but there may be increasing risk of electric shock from strings of connected batteries exceeding three 12-volt units.

Charging:

There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether being charged or not. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

Spill or Leak Procedures:

Stop flow of material, contain/absorb small spills with dry sand, earth, vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of unneutralized acid to sewer. Neutralized acid must be managed in accordance with approved local, state and federal requirements. Consult state environmental agency and/or federal EPA.

Waste Disposal Methods:

Spent batteries: Send to secondary lead smelter for recycling.

Electrolyte:

Place neutralized slurry into sealed acid resistant containers and dispose of as hazardous waste, as applicable. Large water-diluted spills, after neutralization and testing, should be managed in accordance with approved local, state and federal requirements. Consult state environmental agency and/or federal EPA.

Precautionary Labelling:

POISON - CAUSES SEVERE BURNS

DANGER - EXPLOSIVE GASES

CORROSIVE - CONTAINS SULFURIC ACID

KEEP AWAY FROM CHILDREN

VIII. CONTROL MEASURES**Engineering Controls:**

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.

Work Practices:

Handle batteries cautiously, do not tip to avoid spills. Make certain vent caps are on securely. Avoid bodily contact with internal components. Wear protective clothing, eye and face protection, when filling or handling batteries.

Respiratory Protection:

None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.

Protective gloves:

Rubber or plastic acid-resistant gloves with elbow-length gauntlet.

Eye Protection:

Chemical goggles or face shield.

Other Protection:

Acid-resistant apron. Under severe exposure or emergency conditions, wear acid-resistant clothing, gloves and boots.

Emergency Flushing:

In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.