



SPILL CONTINGENCY PLAN EXPLORATION OPERATION HIGH LAKE PROPERTY NUNAVUT, CANADA

October, 2007

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1.0 PREAMBLE

This Spill Contingency Plan has been compiled with respect to the requirements within the Spill Contingency Planning and Reporting Regulations in Northwest Territories as adopted by the Government of Nunavut.

The High Lake Camp layout is shown on Figure 2.

The following formal distribution has been made of this plan: KIA, NWB, Dave Stevenson (Exploration Manager, Zinifex Canada Inc.), Andrew Mitchell (Manager, Environmental Affairs, Zinifex Canada Inc.), John Begeman (Chief Operating Officer, Zinifex Canada Inc.) Ewan Downie (President and Chief Executive Officer – Zinifex Canada Inc.).

2.0 INTRODUCTION

This Spill Contingency Plan is to provides a plan of action for reasonably foreseeable spill events at the High Lake camp considering the nature of the fuels and other hazardous materials that will be handled during the Company's operations. The plan defines the responsibilities of key response personnel and outlines the procedures for responding to spill in a way that will act to minimize potential health and safety hazards, environmental damage and remediation costs. The plan has been prepared to provide ready access to all the information needed in dealing with a spill.

The objectives of the Plan are to:

- Define the reporting procedures and communication network to be used in the event of a system failure or material spill.
- Define procedures for the safe and effective containment and cleanup/disposal of a system failure or material spill.
- Define specific individuals and their responsibilities with respect to responding to a spill.

It is Zinifex Canada Inc. policy to comply with all existing laws and regulations to help ensure the protection of the environment, to provide such protection of the environment as is technically feasible, to cooperate with other groups working on protection of the environment and to keep employees, government officials and the public informed.

Personnel will be instructed on the plan upon arrival in camp. Instruction will also be given on how to properly manipulate and store fuel and other hazardous substances and on the location of emergency equipment. A more graphical representation of this plan will be posted in common camp areas.

2.1. POLICY

2.1.1. ENVIRONMENTAL POLICY

Our aim is to achieve a high standard of care for the natural environment in all of the activities in which we engage.

We undertake to minimize our impact on the environment

We will:



- conduct our operations in compliance with all relevant environmental regulations, licenses and legislation as a minimum condition
- identify, monitor and manage environmental risks arising from our operations
- seek continuous improvement in environmental performance, production processes, waste management and the use of resources
- provide appropriate training and awareness for all employees on environmental issues
- communicate regularly with employees about our aim and about individual responsibilities
- inform our customers and suppliers of our aim and of their responsibilities in relation to our business
- communicate with shareholders, the community and governments about our environmental performance, and contribute to the development of laws and regulations which may affect our business.

3.0 SITE DESCRIPTION

The Camp is located on the southwest shore of High Lake. The site was chosen because it was the location of the original campsite in the 1950's when work on the High Lake deposit was first initiated. Two of the buildings at the camp site date from this period.

The camp consists of 10 wooden buildings, between the dimensions 12'x12' to 16'x32'. These wooden buildings comprise: 2 core shacks, 1 office, 1 foreman's office, 1 sleeper, 1 kitchen, 1 dry, 1 workshop, 1 storage (generator), and 1 recreation area. In addition there are 12 plywood floor canvas walled tents which are used for sleepers, storage, and first aid. See attached map for general camp layout.

Fuel is transported to the site by Buffalo or Hercules ice strip directly onto High Lake. Fuel is then immediately moved by helicopter to one of the three fuel caches. The main fuel cache is located 100m north of the camp site and 150m west of the storage of High Lake. This is the primary cache for the jet fuel and diesel used by the project. A second cache is located 50m southwest of camp and is used primarily for heating fuel during the winter camp operations. A small cache is also established at the west zone drilling site to act as an emergency supply of fuel in case weather does not allow re-supply of drill rigs.

Fuel is stored in 205L drums on racks constructed from drill steel. Drums are elevated off the ground with bungs positioned for easy inspection of leaks. Between all fuel caches after full winter re-supply the total number of drums on site will be 1500 diesel and 750 Jet-B.

Propane is stored in 100lb cylinders at the south end of the camp on separate storage platform. It is supported by a 2"x4" framework to prevent accidental tipping of propane cylinders. Propane is brought to site continually on re-supply flights, with a total number of cylinders stored on site not exceeding 30.

Each of the main buildings will have a drum of fuel supported on wooden crib. A plastic spill container will be placed below each stove and absorbent matting will be zap strapped around each bung/fuel supply assembly.

Other chemicals will be securely stored in the camp area, primarily within the drill foreman's work area.

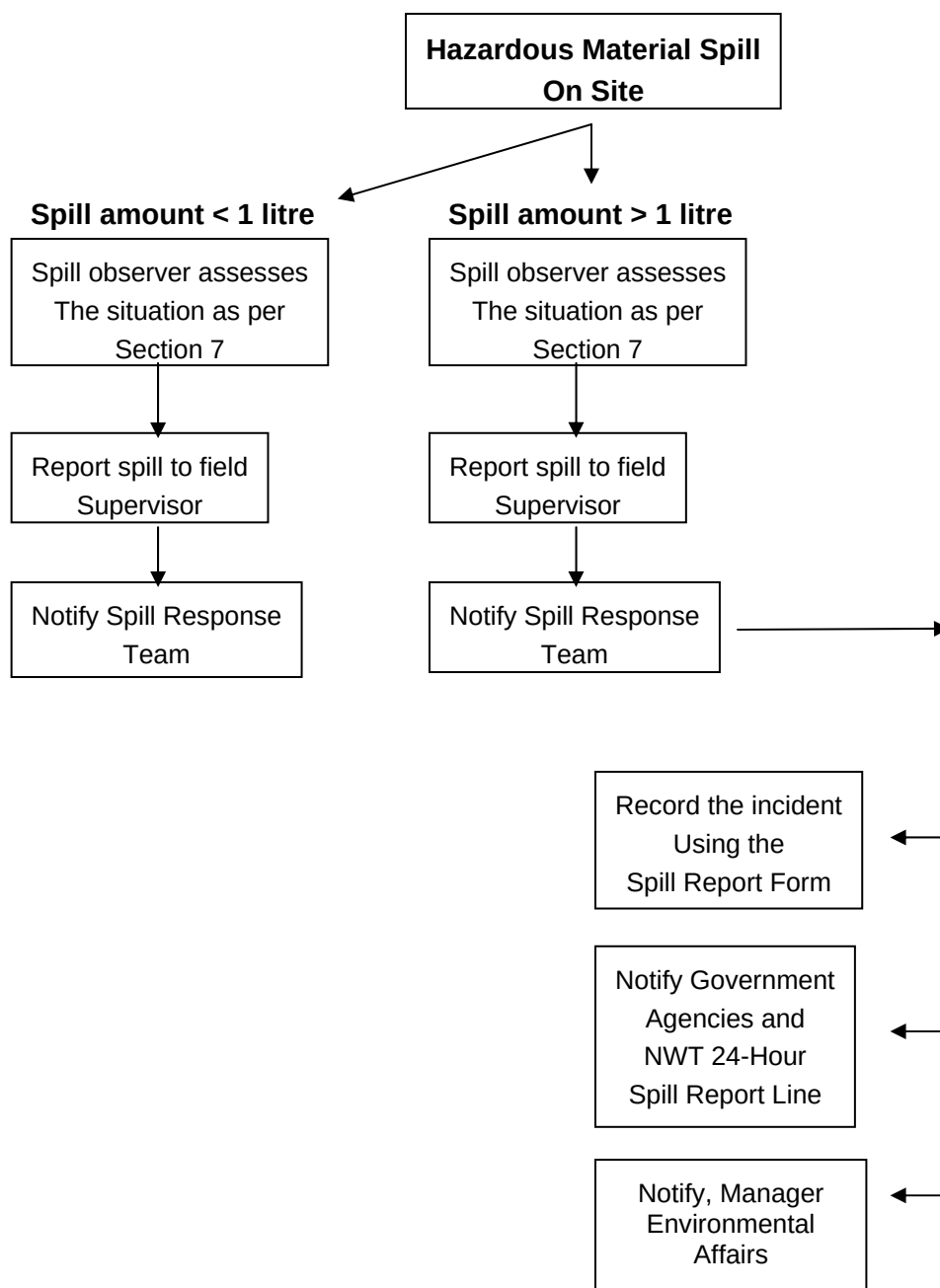
4.0 CONTACTS

People and organizations that can be contacted in the event of a spill:

Exploration Manager	Jason Rickard/Ian Neill	403-435-4959
Camp Manager	Peter Janeskovich / Tom Collett	403-435-4595
Manager, Environmental Manager	Andrew Mitchell	(807)-346-1668
COO Zinifex Canada Inc.	John Begeman	
CEO Zinifex Canada Inc.	Ewan Downie	(807)-346-1668
Kitikmeot Inuit Association	Jack Kaniak	(867)-982-3310
Nunavut Water Board	Phyllis Beaulieu	(867)-360-6338 (867)-360-6369 (fax)
Spill Report Line (24 hr)		(867)-873-6924
Environment Canada		(867)-669-4644
WCB 24 Hour Accidents		(867)-873-7468
WCB Inspector	Peter Bengts	(867)-920-3888
Kugluktuk Health Center	Janet Carstairs	(867)-982-4531
Kugluktuk RCMP	Franco Radescho	(867)-982-1111 (867)-920-8130 (fax)

5.0 RESPONSE ORGANIZATION

The following is a flow chart to illustrate the sequence of events if a hazardous material spill occurs at the Izok, Hood or Gondor Projects.



6.0 SPILL RESPONSE TEAM

All personnel will be informed of the contents of the Spill Contingency Plan and trained in the safe use of relevant spill prevention and clean up equipment. The Field Supervisor will appoint and train two persons to be the Spill Response Team. They will also be responsible to carry out the daily inspections of the fuel storage areas and equipment. Personnel on site will be limited, so for any large spill more people will be brought in to help, from surrounding exploration operations primarily from the IZOK Lake Camp located 75km South of High Lake and secondly from Yellowknife.

Spill Response Team Responsibilities

- Perform daily inspections at the Camp fuel and chemical storage areas and fuel hoses.
- Report any spill to Exploration Manager or designate.
- Containment of the spill and site remediation.

Field Supervisor Responsibilities

- Assume complete authority over the spill scene and coordinate all personnel involved.
- Evaluate spill situation and develop overall plan of action.
- Activate the spill contingency plan
- Immediately report the spill to the NWT 24-Hour Spill Report Line and regulatory agencies. (For spill greater than 1 litre)
- Fill out the Spill Report Form (for spill greater than 1 litre)
- Report the spill to the Project Manager. (For spill greater than 1 litre)
- If required, obtain additional manpower, equipment, and material if not available on site for spill response.

Manager, Environmental Affairs Responsibilities

- Provide regulatory agencies and Zinifex Canada Inc. management with information regarding the status of the clean up activities.
- Prepare and submit a report on the spill incident to regulatory agencies within 30 days of the event.



7.0 INITIAL ACTION

These instructions are to be followed by the first person on the spill scene.

1. Always be alert and consider your safety first.
2. Wear personal protective equipment
3. Do not smoke and eliminate all source of ignition
4. Assess the hazard to people in the vicinity of the spill.
5. If possible control danger to human life
6. Do not touch, smell, taste or get close to unknown substance.
7. If substance has been identified and if possible and safe to do so, try to stop the flow of material.
 - If filling is in progress, stop at once
 - If seeping through a small hole, use a patch kit if practical to do so.
 - If necessary and practical, pump the fuel from the leaking container into a refuge container
8. Immediately report the spill to the Field Supervisor and Spill Response Team by radio, satellite phone or in person.
9. Resume any effective action to contain, mitigate, or terminate the flow of the spilled material.
10. If in doubt about cleaning procedures or for a very large spill, regulatory agencies can help.



8.0 REPORTING

The person who notices the spill must immediately notify the Field Supervisor. As soon as possible the Field Supervisor will report the spill to:

- The 24-Hour Spill Report Line Phone (867) 920-8130, Fax (867) 873-6924
- Fill out the NWT Spill Report Form NWT1752/0202
- Notify the Manager, Environmental Affairs for a spill greater than 1 litre.
- Notify permitting authorities (Nunavut Water Board, Kitikmeot Inuit Association)

9.0 RESOURCE INVENTORY

A spill kit with a capacity of 240 litres will be located at the fuel tank area and will contain:

- 1 – 360 litre/79 gallon polyethylene drum
- 4 – oil absorbent booms (5" X 10')
- 100 – oil absorbent sheets (16.5" X 20" X 3/8")
- 1 – drain cover (36" X 36" X 1/16")
- 1 – Caution tape (3" X 500')
- 1 – 1 lb plugging compound
- 2 – pair Nitrile gloves
- 2 – pair Safety goggles
- 2 – pair Tyvek coveralls
- 1 – instruction booklet
- 10 – printed disposable bags (24" X 48")
- 1- shovel (in remote spill kit only)
- 1- plastic tarp

Shovels, water pump, plastic pails, garbage bags, extra absorbent pad, drip pans will be placed on the side of the wall at the main office and the kitchen. Fire extinguishers are available throughout the camp facility.

Drill Spill Kits with a capacity of 25 L will contain the following:

- 10- Pads (17"x19"x2/8")
- 3 - Socks (3"x4')
- 1 - Pair of Gloves
- 1 - Disposal Bags
- 1 - Warning Sign
- 1 - Literature (Inventory List, MSDS, Instructions)



10.0 HAZARDOUS MATERIAL INVENTORY

This following section lists for each hazardous substance present on the project area, health hazards, spill procedure and disposal procedures. For more detailed information, refer to the MSDS sheets.

10.1. DIESEL FUEL, JET-B, GASOLINE

DIESEL, JET-B AND GASOLINE ARE HIGHLY FLAMMABLE

10.1.1. GENERAL PRECAUTIONS

- Do not smoke
- Will be easily ignited by heat, sparks or flames
- Gasoline and Jet-B are more volatile than diesel
- Explosion hazard indoors, in confined spaces and outdoors
- Vapours may form explosive mixtures with air
- Vapours may travel to source of ignition and flash back
- Most vapours are heavier than air. They will spread along ground and collect in low or confined areas.
- Keep pump or electrical equipment far away, be very careful with metallic tools that could sparks on rocks, wait for vapours to dissipate
- Inhalation may cause central nervous effects
- Aspiration into lungs may cause pneumonitis which can be fatal
- Eye and skin irritation
- Prolonged exposure has caused cancers in laboratory animals

10.1.2. SPILL ON LAND

- Build a containment berm, downslope, using, peat, moss, and soil material, bags filled with sand or rocks and place a plastic tarp at the foot of the berm to pool the spill. Spill can be pumped if in a large amount
- Soak up spilled substance by using absorbent pads
- Excavate the surface soil if necessary. If large excavation is needed, first contact regulatory agencies for approval.
- Remove spill substance splashed on vegetation by applying a thin dusting of Spag-zorb or other ultra-dry absorbent.
- Dispose hydrocarbons, absorbent pad, contaminated soil and cleaning material in an empty drum, seal it and label it.
- On marshy zones, don't destroy vegetal cover, limit personnel and equipment. Remove pooled oil with absorbent pads and/or skimmer.



10.1.3. *SPILL ON WATER*

- Contain spill as close to release point as possible
- On small spill, deploy hydrophobic absorbent pads
- On larger spill and weather conditions permitting, use containment boom to limit fuel dispersion. Use a skimmer, pump or hydrophobic absorbent pads to remove fuel inside the boom.
- Dispose hydrocarbons, absorbent pad, contaminated soil and cleaning material in an empty drum, seal it and label it.

10.1.4. *SPILL ON RIVERS AND STREAMS*

- Prevent entry into water, if possible, by building a berm or trench.
- Intercept moving slicks in quiet areas using (absorbent) booms.
- Do not use absorbent booms/pads in fast currents and turbulent water.

10.1.5. *SPILL ON ICE AND SNOW*

- Build a containment berm of compacted snow around spill.
- If hydrocarbons are pooling on ice, pump large amount or use hydrophobic absorbent pads.
- Don't delay removing the spill as hydrocarbons could seep through cracks into the water.
- Scrape ice, shovel all contaminated snow in plastic buckets with lids or in drums. Dispose absorbent pads and other contaminated equipment in separated containers. Label and seal the containers.

10.1.6. *SPILL DISPOSAL*

- Contact Federal and Territorial regulatory agencies to identify appropriate disposal methods before disposing of contaminated material.

10.2. PROPANE

EXTREMELY FLAMMABLE

10.2.1. *GENERAL PRECAUTIONS*

- Do not smoke
- Cylinders may explode when heated
- Cylinders may rocket if ruptured
- Will be easily ignited by heat, sparks or flames



- Explosion hazard indoors, in confined spaces and outdoors
- Vapours may form explosive mixtures with air
- Vapours may travel to source of ignition and flash back
- Vapours from liquefied gas are initially heavier than air and spread along ground.
- Contact with gas or liquefied gas may cause burns, severe injuries and/or frostbite
- Keep pump or electrical equipment far away, be very careful with metallic tools that could sparks on rocks, wait for vapours to dissipate
- Liquid may cause frostbites and blisters
- Blurred vision if goes in the eyes
- Narcotic aphyxiant
- Dizziness, disorientation, excitation, headache, vomiting, unconsciousness if inhaled

10.2.2. SPILL ON LAND, WATER, ICE AND SNOW

- Eliminate all source of ignition
- Do not attempt to contain the propane release if not absolutely sure on what to do.
- Do not touch or walk through spilled material
- Stop leak if can be done without risk
- If possible, turn container so that gas escapes rather than liquid.
- Water spray can be used to knock down vapours but don't direct water at spill or source of leak
- Prevent spreading of vapours in confined areas
- If or when possible, confine spill with confinement berm. Throw absorbent pads into spill, retrieved them with gaffs or pitchforks.
- Small fire can be extinguished with dry chemical or CO₂.
- Dispose contaminated materials in a labeled drum.

10.2.3. SPILL DISPOSAL

- Contact Federal and Territorial regulatory agencies to identify appropriate disposal methods for defective equipment that resulted in the release.

10.3. MOTOR OIL, HYDRAULIC OIL, TRANSMISSION FLUID

10.3.1. GENERAL PRECAUTIONS

- Avoid breathing mists, may cause lung irritation
- On skin may cause mild irritation

10.3.2. SPILL ACTION

Soak up with absorbent material



- Disposed contaminated soil and material in sealed and labeled container
- Small amount can be incinerated
- Large amount to be disposed as hazardous waste.

10.4. ANTIFREEZE

10.4.1. GENERAL PRECAUTIONS

- Respiratory irritation with prolonged exposure.
- Kidney, liver and bladder problems reported in animals

10.4.2. SPILL ON LAND

- Soak up by using absorbent pads
- Dispose antifreeze, absorbent pad, contaminated soil and cleaning material in an empty drum, seal it and label it.
- On marshy zones, don't destroy vegetal cover, limit personnel and equipment. If possible remove pooled antifreeze with absorbent pads.

10.4.3. SPILL ON RIVERS AND STREAMS

- Prevent entry into water, if possible, by building a berm or trench.

10.4.4. SPILL ON ICE AND SNOW

- Build a containment berm of compacted snow around spill.
- If pooling on ice, pump large amount or use absorbent pads.
- Don't delay removing the spill as it can seep through cracks into the water.
- Scrape ice, shovel all contaminated snow into plastic buckets with lids or in drums.
- Dispose absorbent pads and other contaminated equipment in separated containers. Label and seal the containers.

10.4.5. SPILL DISPOSAL

- Contact Federal and Territorial regulatory agencies to identify appropriate disposal methods before disposing of contaminated material.

10.5. BATTERY ACID

10.5.1. GENERAL PRECAUTIONS

- Fire and explosion hazard
- Can be extinguished with dry chemical fire extinguisher.
- Ventilate area
- Remove combustible materials



- Mist inhalation hazard when being charged or spilled
- Acid burns to skin and eyes irritation

10.5.2. SPILL ACTION

- Neutralize with soda or lime
- Dispose battery and neutralized contaminated material in a sealed and labeled container
- Dispose as an hazardous waste

10.6. POLY-DRILL DR-133

10.6.1. GENERAL PRECAUTIONS

- May cause skin and eye irritation

10.6.2. SPILL ACTION

- Soak up with absorbent pad
- Dispose residue, contaminated soil and material in labeled containers. Solidify with sand.
- Small amount can be incinerated, otherwise dispose as hazardous waste.

10.7. 550-X POLYMER

10.7.1. GENERAL PRECAUTIONS

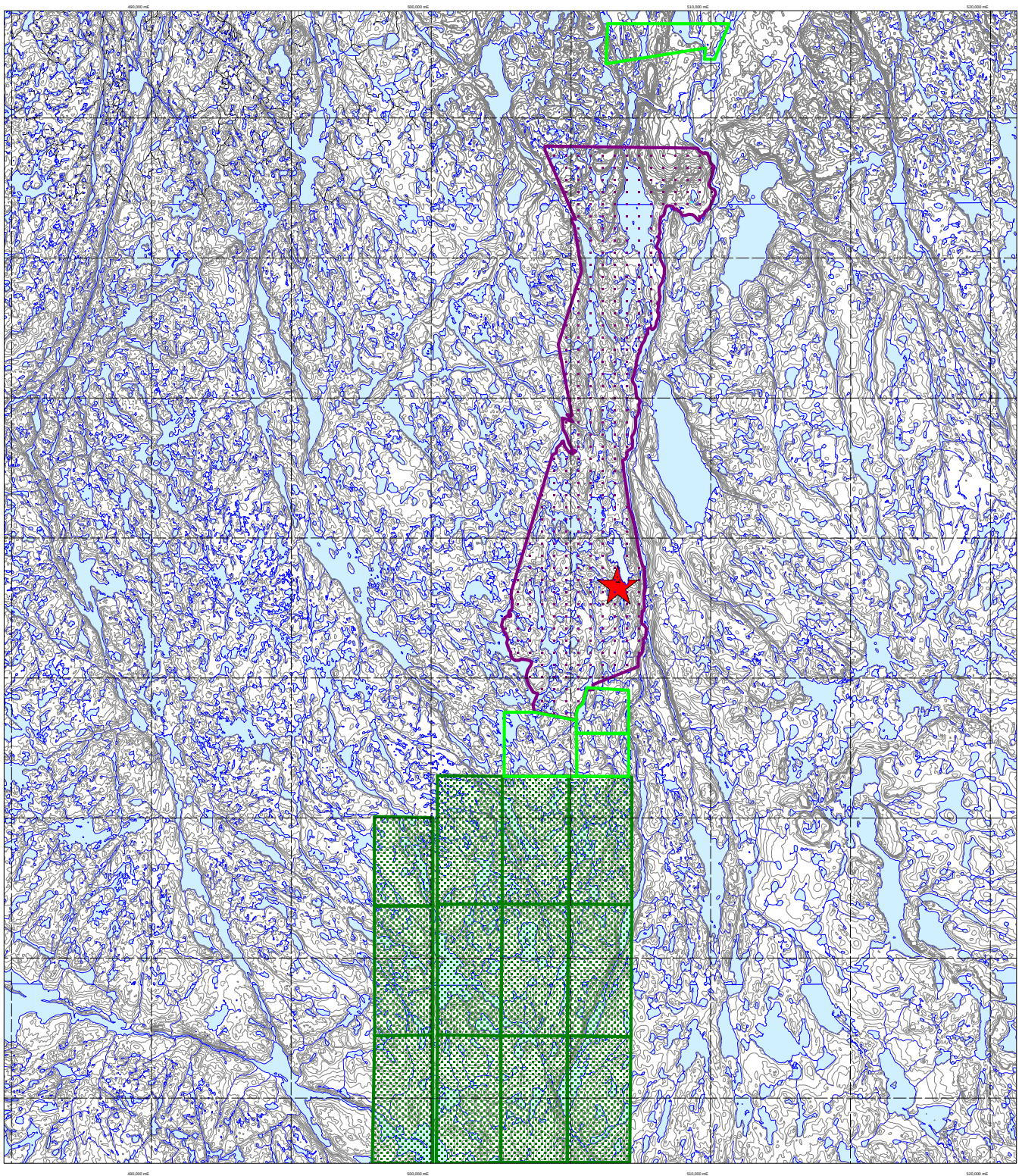
- Prolonged skin contact may cause irritation
- Possible eye irritation
- Ingestion may cause nausea, vomiting, cramps, diarrhea

10.7.2. SPILL ACTION

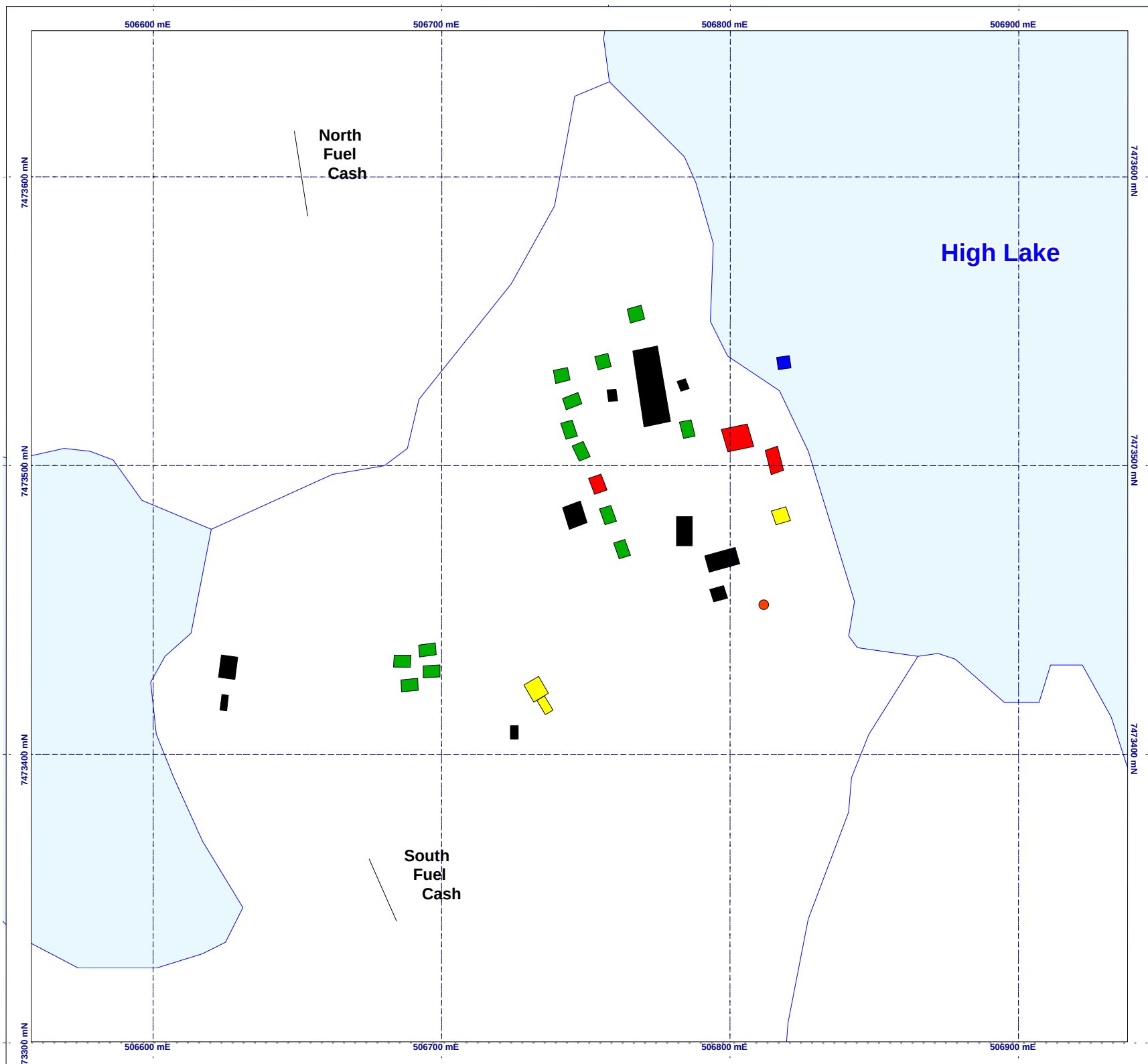
- Clean up spill with gloves. Scrape soil or surface and disposed in labeled containers
- Dispose as hazardous waste



FIGURES



Legend <table border="0"> <tr> <td></td> <td>Contour</td> <td></td> <td>Water Course</td> </tr> <tr> <td></td> <td>Western Claims</td> <td></td> <td>Waterbody</td> </tr> <tr> <td></td> <td>Irish Owned Land</td> <td></td> <td>Blackstone Joint Venture</td> </tr> <tr> <td></td> <td>High Lake Camp</td> <td></td> <td></td> </tr> </table>		Contour		Water Course		Western Claims		Waterbody		Irish Owned Land		Blackstone Joint Venture		High Lake Camp			High Lake Property Camp Layout 	Projection: UTM Zone 12 NAD83 Revision: 0 Date: November 8, 2007  Scale 1:100,000 Map: 2
	Contour		Water Course															
	Western Claims		Waterbody															
	Irish Owned Land		Blackstone Joint Venture															
	High Lake Camp																	



Legend
High Lake Camp Site

- | | |
|--|---|
|  Weatherhaven Facilities |  Helicopter Pads |
|  Office, Kitchen, Recreation, Core Shack, Storage Sheds |  Waterbody |
|  Generator Generator |  Incinerator |

**High Lake Property
Camp Layout**



Projection: UTM Zone 12 NAD83
Revision: 0
Date: November 8, 2007

0 25 50 metres Scale 1:2,000

Map: 1



MSDS SHEETS



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	STOVE OIL	Code	W107 SAP: 154
Synonym	Stove Oil 55, Switch Heater Fuel, Tobacco Curing Oil, No.1 Diesel, No.1 Furnace Oil, #1 Furnace Oil, ThermaClean.	Validated on	2/24/2004.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Stove Oils are light distillate fuels suitable for use in liquid fuel burning equipment without preheating.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C9-C18)	64742-81-0	>99.9	Not established	Not established	Not established
Trace of functional additives.	64742-80-9	<0.1	Not established	Not established	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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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	CLOSED CUP: >40°C (104°F). (Closed Cup)	Auto-Ignition Temperature	225°C (437°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and 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.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container. 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 vapours as products of incomplete combustion.
Fire Fighting Media and Instructions	NAERG96, 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, ISOLATE 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	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Extinguish all ignition sources. Evacuate non-essential personnel. Ventilate area. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Avoid confined spaces and areas with poor ventilation. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded.

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 (may be dyed for taxation purposes).	Pour Point	Variable, -50°C to 0°C (-58°F to 32°F)
Odour	Mild petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	150 - 315°C (302 - 599°F)	Penetration	Not applicable.
Density	0.80 - 0.85 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (in water)	Not available
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.	Decomposition Products	May release COx, NOx, SOx, H2S, 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 toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: <u>Kerosine (petroleum), hydrosulfurized (64742-81-0):</u> Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >5000 mg/m³/4h (rat) <u>Distillates (petroleum), hydrodesulfurized middle (64742-80-9):</u> Acute Inhalation toxicity (LC50): 4600 mg/m³/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.

Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH. (Considered to be A3 by the ACGIH. Kerosine (petroleum), hydrosulfurized, 64742-81-0).
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.			

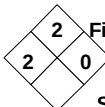
Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	FUEL OIL, 3, UN1202, PGIII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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/DPD (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).										
ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN		DOT (U.S.A) (Pictograms) 										
HMIS (U.S.A.)		<table><tr><td>Health Hazard</td><td>(2*)</td></tr><tr><td>Fire Hazard</td><td>(2)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(H)</td></tr></table>		Health Hazard	(2*)	Fire Hazard	(2)	Reactivity	(0)	Personal Protection	(H)	NFPA (U.S.A.) Health  Fire Hazard Reactivity Specific hazard		Rating 0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
Health Hazard	(2*)													
Fire Hazard	(2)													
Reactivity	(0)													
Personal Protection	(H)													

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/CGA B149.2 Propane 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
 CNS - Central Nervous System
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPA - Environmental Protection Agency
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazard Communication Standard
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance 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 MSDSInternet: www.petro-canada.ca/msds

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax:
 1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 2/24/2004.

Data entry by Product Safety - DSR.

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	TDG (pictograms)
 	A, B-1	   	

Section 1. Chemical Product and Company Identification

Product Name	PROPANE	Code	W222 SAP: 169
Synonym	Propane HD-5, Propane commercial, Liquefied Petroleum Gas (LPG), C3H8, CGSB Propane Grade 1, CGSB Propane Grade 2, odourized propane, stenched propane, automotive propane.	Validated on	3/17/2004.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Propane is used as a fuel gas, refrigerant, automotive fuel and as a raw material for organic synthesis. The grade determines the propane content. It is supplied as pressurized liquid in tanks.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
HD-5 Propane	74-98-6	>90	1000 ppm	Not established	Not established
Propane	115-07-1	<5	Simple Asphyxiant	Not established	Not established
Propene					
Commercial Propane	74-98-6	>75	1000 ppm	Not established	Not established
Propane	115-07-1	<20	Simple Asphyxiant	Not established	Not established
Propene					
Both grades may contain:					
Ethane	74-84-0	<6	1000 ppm	Not established	Not established
Butane +	106-97-8	<5	1000 ppm	Not established	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	The product is contained under pressure. Do not puncture, incinerate or heat container as contents may explode. Flammable gas. Exercise caution when handling this material. Propane may displace oxygen and cause asphyxiation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Contact with gas or liquified gas may cause burns and frostbite to eyes and skin. Ingestion is not an expected route of exposure. 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	Ingestion is not an applicable route of exposure for gases.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Class I - flammable gas (NFPA).	Flammable Limits	Lower: 2.1%; Upper: 9.5%, (NFPA).
Flash Points	CLOSED CUP: -104°C (-155°F).	Auto-Ignition Temperature	450°C (842°F), (NFPA).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapours may generate static charge causing ignition. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapour explosion hazard indoors, outdoors or in sewers. Propane may form explosive mixtures with air.
Products of Combustion	Carbon oxides (CO, CO ₂), acrid smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG2000, GUIDE 115, Flammable Gas: 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. Self-contained breathing apparatus (SCBA) will be required if approaching the fire from downwind, or to enter enclosed areas or buildings. Handle damaged cylinders with extreme care.		

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Stop leak if safe to do so. Ventilate area. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid breathing vapours of material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	EXTREMELY FLAMMABLE GAS. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours. Wear proper personal protective equipment (See Section 8). Rapid escape of vapour may generate static charge causing ignition. Use spark-proof electrical equipment. Do not allow escaping compressed gas or liquid to come in contact with skin or eyes as it can cause frostbite. SPECIAL PRECAUTIONS: Sludges and tank scale from propane storage tanks, trucks and rail cars, and filters/screens may contain naturally occurring radioactive material ("NORM") in the form of lead 210. Similarly, equipment used for the transfer of propane such as product pipelines, pumps and compressors, may have detectable levels of radioactive lead 210 on inner surfaces. Workers involved in cleaning, repair or other maintenance on inner surfaces of such equipment should avoid breathing dust generated from such activities. Suitable codes of practice should be developed for these activities, detailing appropriate occupational hygiene and disposal practices.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Store away from heat and sources of ignition. Store as flammable material. Compressed gases should be stored in a separate safety storage cabinet or room. Avoid direct sunlight. Keep container tightly closed. Store in dry, cool, well-ventilated area.

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 based on the condition of use. As a minimum, safety glasses with side shields should be worn when handling this material.
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. Wear insulated gloves to prevent from frostbite.
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	Gas at room temperature; liquid when stored under pressure.	Viscosity	Not applicable.
Colour	Colourless.	Pour Point	Not applicable.
Odour	Propane is an odourless gas. Odourized propane will contain up to 28 g ethyl mercaptan per 1000 L of propane.	Softening Point	Not applicable.
Odour Threshold	Odour is not an adequate warning to prevent overexposure to propane. Prolonged exposure to mercaptans can cause olfactory desensitization.	Dropping Point	Not applicable.
Boiling Point	-42°C (-44°F)	Penetration	Not applicable.
Density	508 kg/m ³ @ 15°C (59°F)	Oil / Water Dist. Coefficient	Not available
Vapour Density	1.56 (air=1)	Ionicity (in water)	Not available
Vapour Pressure	10763 mmHg (1435 kPa) @ 38°C (100°F)	Dispersion Properties	Not available
Volatility	Volatile	Solubility	Slightly soluble in water.

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.	Decomposition Products	May release CO _x , acrid smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Inhalation, skin contact and eye contact.
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: <u>Propene (115-07-1):</u> Acute inhalation toxicity (LC50): >50000 ppm/4h (rat). <u>Butane (106-97-8):</u> Acute inhalation toxicity (LC50): 202000 ppm/4h (mouse).
Chronic or Other Toxic Effects	
Dermal Route:	Contact with gas or liquefied gas may cause burns and frostbite to the skin.
Inhalation Route:	Propane may displace oxygen and cause asphyxiation. Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion is not an applicable route of exposure for gases.
Eye Irritation/Inflammation:	Contact with gas or liquefied gas may cause burns and frostbite to the eyes.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.

Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.			

Section 13. Disposal Considerations

Waste Disposal	Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	PROPANE, 2.1, UN1978 (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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/DPD (Europe)		Not evaluated.		HCS (U.S.A.) CLASS: Flammable gas. CLASS: Compressed gas. CLASS: Target organ effects.																
ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		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>4</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	4	Reactivity	0	Personal Protection	H	NFPA (U.S.A.) Health <table><tr><td>4</td><td>Fire Hazard</td></tr><tr><td>1</td><td>0</td></tr><tr><td></td><td>Reactivity</td></tr></table> Specific hazard		4	Fire Hazard	1	0		Reactivity	Rating 0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
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Section 16. Other Information**References**

Available upon request.

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 WHMIS - Workplace Hazardous Material Information System

For Copy of MSDSInternet: www.petro-canada.ca/msds**Fuels & Solvents:**

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax:
 1-800-837-1228

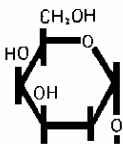
Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 3/17/2004.

Data entry by Product Safety - DSR.

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.



Poly-Drill Drilling Systems

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poly-drill.com



MATERIAL SAFETY DATA SHEET/FICHE SIGNALÉTIQUE

1. PRODUCT IDENTIFICATION

PRODUCT TRADE NAME(S): Poly Drill O.B.X.

WHMIS CLASSIFICATION: Non-regulated

TDG Classification: Non dangerous goods

DATE: November 17, 2004

A liquid polymer containing guar gum, mineral oil, vegetable oil, acrylamide copolymer and a surfactant: Evaluation of the ingredient(s) has found no ingredient(s) hazardous as per WHMIS regulations.

2. PHYSICAL DATA

Boiling Point: Not available

Specific Gravity: 0.9 g/cm

Solubility in Water: disperses in water(forms viscous, slippery solution).

pH: 3.8 (1% concentration)

Density (g/ml): Not available

Physical State: Liquid

Appearance and Odor: Brown. Odor slight.

3. FIRE AND EXPLOSION DATA

Flash Point (method used): (PMCC) greater than 100 C.

Conditions of flammability: Very low risk.

Hazardous combustion products: None known.

Upper and Lower flammable limits: Not available.

Extinguishing media: Carbon dioxide, dry chemicals, foam, in preference to water spray

4. REACTIVITY

Chemical stability: Stable under normal conditions.

Hazardous Polymerization: Will not occur.

Incompatible substances: Avoid strong oxidants such as liquid chlorine, concentrated oxygen, sodium or calcium hypo chloride.

Hazardous decomposition products: None known

5. HEALTH HAZARD DATA

TOXICITY RATING: Practically non-harmful.

Routes of Exposure and Effects:

SKIN: Slight irritant: prolonged contact may cause skin irritation or dermatitis in some individuals

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

INHALATION: Due to low volatility of mineral distillates a small inhalation hazard exists.

INGESTION: can cause nausea, vomiting, cramps, diarrhea
Chronic exposure limits: None
Sensitization of product: Not suspected to be a sensitizer.
Teratogenicity: Not available.
Mutagenicity: Not available.
Carcinogenicity: None of the components of this product are listed as carcinogens by IARC and ACGIH

6. EMERGENCY AND FIRST AID PROCEDURES

SKIN: Wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before re-use. If irritation or abnormalities persist, call a physician.

EYE: Immediately flush eyes with water for 15 minutes, lifting upper and lower lids occasionally. Get medical attention.

INHALATION: Remove to fresh air. If breathing becomes difficult, give oxygen and call a physician.

INGESTION: Do not induce vomiting: Call a physician immediately or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.

8. INDUSTRIAL HYGIENE CONTROL MEASURES

Respiratory Protection: None normally required.

Ventilation: If mist and/or vapors are present, use air purifying respirator or self-contained breathing apparatus, but this is rarely required.

Eye Protection: Safety glasses, if personally preferred

Gloves: Generally not necessary. Personal preference.

7. HANDLING AND USE PRECTIONS

Storage requirements: keep container closed when no in use. Store in a cool dry location away from oxidizing and reducing agents.

Waste Disposal: product should be disposed of in accordance with applicable local, Provincial and Federal regulations.

Steps must be taken if product is released or spilled: clean spill areas thoroughly to avoid hazardous slippery conditions.

8. TOXICOLOGICAL PROPERTIES

G50 Microtox Analysis prepared by HydroQual Laboratories, Calgary, AB--97/6/26 Test#970978:

Test Description	EC20	EC50	Pass/Fail
MTX	>91	>91	PASS

9. DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

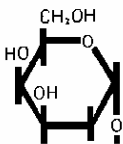
Shipping Name: Liquid Drilling Additive

Hazard Class: Not hazardous

Hazardous Substances: None
Cautionary Labeling: None required

10. OTHER INFORMATION

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



Poly-Drill Drilling Systems

1824 - 104 Avenue, S.W.
Calgary, Alberta, Canada T2W-OA8
(403) 259-5112 FAX (403) 255-7185
email: polydril@telus.net
www.poly-drill.com

poly-drill.com



MATERIAL SAFETY DATA SHEET/FICHE SIGNALÉTIQUE

1. PRODUCT IDENTIFICATION

PRODUCT TRADE NAME: Poly-Drill 1330-W
PRODUCT DESCRIPTION: LIQUID ANIONIC POLYMER
CHEMICAL DESCRIPTION: Polymer, Surfactant(s), Water, Hydrocarbon solvent
UPDATED: March 15, 2004

NFPA704M/HMIS RATING

HEALTH: 0/1 FLAMMABILITY: 1/1 REACTIVITY: 0/0 OTHER:
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

2. COMPOSITION

A liquid polymer: Evaluation of the ingredient(s) has found no ingredient(s) hazardous as per WHMIS regulations. None of the substances in this product are hazardous.

3. PHYSICAL DATA

Flash Point: >100°C (PMCC)
Specific Gravity (@ 25°C.): 1.08
Solubility in Water: Emulsifiable
pH: 8.1 (1.0% solution)
Freeze Point: -10 °C (14 Degrees F)
Density (g/ml): 1.08 at 25 °C
Physical State: Liquid
Appearance: Blue liquid
Odor: Hydrocarbon

Note: These physical properties are typical values for this product.

4. FIRE AND EXPLOSION DATA

INCOMPATIBILITY: Avoid contact with strong oxidizers (eg. Chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, oxides of carbon (COx), oxides of nitrogen (NOx) may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

5. FIRE FIGHTING MEASURES

FLASH POINT: >100°C (PMCC)

EXTINGUISHING MEDIA: Based on the NFPA guide, use dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For larger fires, use water spray or fog, thoroughly drenching the burning material.

UNSUITABLE EXTINGUISHING MEDIA:
Do not use water unless flooding amounts are available.

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve oxides of nitrogen (NO_x) under fire conditions.

6. HEALTH HAZARD DATA

EMERGENCY OVERVIEW:

CAUTION: May cause irritation to skin and eyes. Avoid contact with skin, eyes and clothing. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye & Skin

EYE CONTACT: Can cause mild to moderate irritation

SKIN CONTACT: Can cause mild, short-lasting irritation

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

7. EMERGENCY AND FIRST AID PROCEDURES

SKIN: Wash exposed area with soap and water. If irritation or abnormalities persist, call a physician.

EYE: Immediately flush eyes with water for 15 minutes, if irritation or abnormalities persist, call a physician.

INHALATION: Remove to fresh air. If breathing becomes difficult, give oxygen and call a physician.

INGESTION: Do not induce vomiting: Call a physician immediately.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water. Call for medical assistance immediately.

8. HANDLING, ACCIDENTAL RELEASE MEASURES & DISPOSAL CONSIDERATIONS

Storage: Keep container tightly closed when not in use.

DISPOSAL:

In Ontario, the waste class under Regulation 347 is: 233L

SMALL SPILLS:

Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area.

LARGE SPILLS:

Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated.

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage.

ENVIRONMENTAL PRECAUTIONS

This product should NOT be directly discharged into lakes, ponds, streams, waterways or public water supplies.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state, provincial and federal regulations.

9. INDUSTRIAL HYGIENE CONTROL MEASURES

OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any substance that has an established exposure limit.

Respiratory Protection: None normally required.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

Ventilation: General ventilation is recommended.

Eye Protection: Safety glasses, if personally preferred

Gloves: Generally not necessary. Personal preference. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton, and butyl (compatibility studies have not been performed).

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

10. TOXICOLOGICAL PROPERTIES

SENSITIZATION:

This product is not expected to be a sensitizer.

A "LC50-96" Pass/Fail Bioassay test. This test determines the lethality of a fluid on young aquatic organisms. The fluid fails if 50% or more of the animals are dead after 96 hours in the fluid.

96 hour static acute LC50 to Rainbow Trout = Greater than 1,000 mg/L

96 hour no observed effect concentration = 125 mg/L based on no mortality or abnormal effects

96 hour static acute LC50 to Sheepshead Minnow = Greater than 1,000 mg/L

96 hour no observed effect concentration = 1,000 mg/L (highest concentration tested) based on no mortality or abnormal effects.

96 hour static acute LC50 to Mysid Shrimp = 400 mg/L

96 hour no observed effect concentration = 180 mg/L based on no mortality or abnormal effects.

96 hour static acute LC50 to Daphnia Magna - 400 mg/L

96 hour no observed effect concentration = 56 mg/L (lowest concentration tested) based on no mortality or abnormal effects.

Microtoxicity

The Microtox bioassay has been established as the reference test for mud additive toxicity testing.

Test Method: Luminescent Bacteria, IC50@ 15 min

Reference: Appendix 1: Microtox Bioassay Procedure, Drilling Waste Management, Guide G50. 1993. Alberta Energy and Utilities Board, Calgary, AB, Canada.

Sample: Poly Drill 1330, sample #97324-1 for test #970723, 97/05/09 by D. Lintott

Preparation: Sample was diluted to 2 g/L, which formed thick, slightly cloudy liquid. The sample was then centrifuged for 1 hour.

Test Results:

SAMPLE	TREATMENT	%CTL	IC20%	IC50	RESULT
97324-1	None	N/A	14 (9-22)	>91	PASS

The following results are for a 1% aqueous solution of product.

CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Government Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION:

Based on our Hazard Characterization, the potential human hazard is: LOW

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION:

Based on our Hazard Characterization, the potential environmental hazard is: LOW.

11. DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

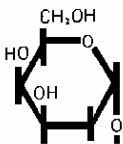
Shipping Name: Drilling Mud

Hazard Class: Not hazardous

Cautionary Labeling: None required

12. OTHER INFORMATION

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



Poly-Drill Drilling Systems

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www.poly-drill.com

poly-drill.com



MATERIAL SAFETY DATA SHEET/FICHE SIGNALÉTIQUE

1. PRODUCT IDENTIFICATION

PRODUCT TRADE NAME: Poly-Drill 133-X
PRODUCT DESCRIPTION: LIQUID ANIONIC POLYMER
CHEMICAL DESCRIPTION: Polymer, Surfactant(s), Water, Hydrocarbon solvent
UPDATED: March 15, 2004

NFPA704M/HMIS RATING

HEALTH: 0/1	FLAMMABILITY: 1/1	REACTIVITY: 0/0	OTHER:
0=Insignificant	1=Slight 2=Moderate	3=High	4=Extreme

2. COMPOSITION

A liquid polymer: Evaluation of the ingredient(s) has found no ingredient(s) hazardous as per WHMIS regulations. None of the substances in this product are hazardous.

3. PHYSICAL DATA

Flash Point: >100°C (PMCC)
Specific Gravity (@ 25°C.): 1.08
Solubility in Water: Emulsifiable
pH: 8.1 (1.0% solution)
Freeze Point: -10 °C (14 Degrees F)
Density (g/ml): 1.08 at 25 °C
Physical State: Liquid
Appearance: Blue liquid
Odor: Hydrocarbon

Note: These physical properties are typical values for this product.

4. FIRE AND EXPLOSION DATA

INCOMPATIBILITY: Avoid contact with strong oxidizers (eg. Chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, oxides of carbon (COx), oxides of nitrogen (NOx) may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

5. FIRE FIGHTING MEASURES

FLASH POINT: >100°C (PMCC)

EXTINGUISHING MEDIA: Based on the NFPA guide, use dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For larger fires, use water spray or fog, thoroughly drenching the burning material.

UNSUITABLE EXTINGUISHING MEDIA:
Do not use water unless flooding amounts are available.

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve oxides of nitrogen (NO_x) under fire conditions.

6. HEALTH HAZARD DATA

EMERGENCY OVERVIEW:

CAUTION: May cause irritation to skin and eyes. Avoid contact with skin, eyes and clothing. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye & Skin

EYE CONTACT: Can cause mild to moderate irritation

SKIN CONTACT: Can cause mild, short-lasting irritation

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

7. EMERGENCY AND FIRST AID PROCEDURES

SKIN: Wash exposed area with soap and water. If irritation or abnormalities persist, call a physician.

EYE: Immediately flush eyes with water for 15 minutes, if irritation or abnormalities persist, call a physician.

INHALATION: Remove to fresh air. If breathing becomes difficult, give oxygen and call a physician.

INGESTION: Do not induce vomiting: Call a physician immediately.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water. Call for medical assistance immediately.

8. HANDLING, ACCIDENTAL RELEASE MEASURES & DISPOSAL CONSIDERATIONS

Storage: Keep container tightly closed when not in use.

DISPOSAL:

In Ontario, the waste class under Regulation 347 is: 233L

SMALL SPILLS:

Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area.

LARGE SPILLS:

Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated.

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage.

ENVIRONMENTAL PRECAUTIONS

This product should NOT be directly discharged into lakes, ponds, streams, waterways or public water supplies.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state, provincial and federal regulations.

9. INDUSTRIAL HYGIENE CONTROL MEASURES

OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any substance that has an established exposure limit.

Respiratory Protection: None normally required.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

Ventilation: General ventilation is recommended.

Eye Protection: Safety glasses, if personally preferred

Gloves: Generally not necessary. Personal preference. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton, and butyl (compatibility studies have not been performed).

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

10. TOXICOLOGICAL PROPERTIES

SENSITIZATION:

This product is not expected to be a sensitizer.

A "LC50-96" Pass/Fail Bioassay test. This test determines the lethality of a fluid on young aquatic organisms. The fluid fails if 50% or more of the animals are dead after 96 hours in the fluid.

96 hour static acute LC50 to Rainbow Trout = Greater than 1,000 mg/L

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96 hour static acute LC50 to Sheepshead Minnow = Greater than 1,000 mg/L

96 hour no observed effect concentration = 1,000 mg/L (highest concentration tested) based on no mortality or abnormal effects.

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96 hour no observed effect concentration = 56 mg/L (lowest concentration tested) based on no mortality or abnormal effects.

Microtoxicity

The Microtox bioassay has been established as the reference test for mud additive toxicity testing.

Test Method: Luminescent Bacteria, IC50@ 15 min

Reference: Appendix 1: Microtox Bioassay Procedure, Drilling Waste Management, Guide G50. 1993. Alberta Energy and Utilities Board, Calgary, AB, Canada.

Sample: Poly Drill 1330, sample #97324-1 for test #970723, 97/05/09 by D. Lintott

Preparation: Sample was diluted to 2 g/L, which formed thick, slightly cloudy liquid. The sample was then centrifuged for 1 hour.

Test Results:

SAMPLE	TREATMENT	%CTL	IC20%	IC50	RESULT
97324-1	None	N/A	14 (9-22)	>91	PASS

The following results are for a 1% aqueous solution of product.

CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Government Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION:

Based on our Hazard Characterization, the potential human hazard is: LOW

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION:

Based on our Hazard Characterization, the potential environmental hazard is: LOW.

11. DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Shipping Name: Liquid Drilling Additive

Hazard Class: Not hazardous

Cautionary Labeling: None required

14. OTHER INFORMATION

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



Material Safety Data Sheet

Dow Chemical Canada, Inc

Product Name: PELADOW* DG Calcium Chloride

Issue Date: 2005.09.29

Print Date: 29 Sep 2005

Dow Chemical Canada, Inc encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

PELADOW* DG Calcium Chloride

COMPANY IDENTIFICATION

Dow Chemical Canada, Inc
A Subsidiary of The Dow Chemical Company
PO Box 3030
1425 Vidal Street South
Sarnia, ON N7T 8C6
Canada

Prepared By:

Prepared for use in Canada by EH&S, Product Regulatory
Management Department.
450-652-1029

Revision

2005.09.29

Print Date:

9/29/2005

Customer Information Number:

800-331-6451

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

519-339-3711

2. Hazards Identification

Emergency Overview

Color: White

Physical State: Solid

Odor: Odorless

Hazards of product:

WARNING! Causes eye irritation. May cause skin irritation. May be harmful if swallowed.
Isolate area.

* Indicates a Trademark

Potential Health Effects

Eye Contact: For dust: May cause severe eye irritation. May cause corneal injury. Effects may be slow to heal.

Skin Contact: Brief contact is essentially nonirritating to skin. Prolonged contact may cause skin irritation, even a burn. Not classified as corrosive to the skin according to DOT guidelines. May cause more severe response if skin is damp. May cause more severe response if skin is abraded (scratched or cut). May cause more severe response on covered skin (under clothing, gloves).

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: Dust may cause irritation to upper respiratory tract (nose and throat). Vapors are unlikely due to physical properties.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in gastrointestinal irritation or ulceration.

Effects of Repeated Exposure: The data presented are for the following material: Potassium chloride. In animals, effects have been reported on the following organs after ingestion: Gastrointestinal tract. Heart. Kidney. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

3. Composition/information on ingredients

Component	CAS #	Amount W/W
Calcium chloride	10043-52-4	> 91.0 - < 93.0 %
Sodium chloride	7647-14-5	> 1.0 - < 2.0 %
Potassium chloride	7447-40-7	> 2.0 - < 3.0 %
Water	7732-18-5	> 1.0 - < 4.0 %

Amounts are presented as percentages by weight.

4. First-aid measures

Eye Contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

Notes to Physician: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: This material does not burn. If exposed to fire from another source, use suitable extinguishing agent for that fire.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. This material does not burn. Fight fire for other material that is burning. Water should be applied in large quantities as fine spray.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers,

boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Unusual Fire and Explosion Hazards: Heat is generated when product mixes with water.

Hazardous Combustion Products: Not applicable.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small and large spills: Contain spilled material if possible. Collect in suitable and properly labeled containers. Flush residue with plenty of water.

See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Do not swallow. Heat developed during diluting or dissolving is very high. Use cool water when diluting or dissolving (temperature less than 80°F, 27°C). See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Keep container closed. Store in a dry place. Protect from atmospheric moisture.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Calcium chloride	DOW IHG	TWA	10 mg/m3
	CAD ON OEL	TWA	5 mg/m3

Consult local authorities for recommended exposure limits.

Personal Protection

Eye/Face Protection: Use safety glasses. For dusty operations or when handling solutions of the material, wear chemical goggles.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. Examples of preferred glove barrier materials include: Neoprene. Polyvinyl chloride ("PVC" or "vinyl"). Nitrile/butadiene rubber ("nitrile" or "NBR"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. In dusty or misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Particulate filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Solid
Color	White
Odor	Odorless
Flash Point - Closed Cup	Not applicable
Flammable Limits In Air	Lower: <i>Literature</i> Not applicable Upper: <i>Literature</i> Not applicable
Autoignition Temperature	Not applicable
Vapor Pressure	0.009 mmHg @ 20 °C <i>Literature</i>
Boiling Point (760 mmHg)	>= 204 °C <i>Literature</i>
Vapor Density (air = 1)	<i>Not applicable</i>
Specific Gravity (H2O = 1)	Not applicable
Freezing Point	Not applicable
Melting Point	772 °C <i>Literature</i> (Approx.)
Solubility in Water (by weight)	soluble in water
pH	Not applicable

10. Stability and Reactivity

Stability/Instability

Stable. Hygroscopic.

Conditions to Avoid: None known. Avoid moisture.

Incompatible Materials: Heat is generated when mixed with water. Spattering and boiling can occur. Avoid contact with: Sulfuric acid. Corrosive when wet. Flammable hydrogen may be generated from contact with metals such as: Zinc. Sodium.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Does not decompose.

11. Toxicological Information

Acute Toxicity

Ingestion

For the major component(s): LD50, Rat 900 - 2,100 mg/kg

Skin Absorption

For the major component(s): LD50, Rabbit > 5,000 mg/kg

Repeated Dose Toxicity

The data presented are for the following material: Potassium chloride. In animals, effects have been reported on the following organs after ingestion: Gastrointestinal tract. Heart. Kidney. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

Developmental Toxicity

For the major component(s): Did not cause birth defects or any other fetal effects in laboratory animals.

Genetic Toxicology

The data presented are for the following material: Calcium chloride or CaCl₂. In vitro genetic toxicity studies were negative. The data presented are for the following material: Potassium chloride. In vitro genetic toxicity studies were positive. However, the relevance of this to humans is unknown.

12. Ecological Information

CHEMICAL FATE

Data for Component: **Calcium chloride**

Movement & Partitioning

No bioconcentration is expected because of the relatively high water solubility. Partitioning from water to n-octanol is not applicable.

Persistence and Degradability

Biodegradation is not applicable.

Data for Component: **Sodium chloride**

Movement & Partitioning

No bioconcentration is expected because of the relatively high water solubility. Potential for mobility in soil is very high (K_{oc} between 0 and 50). Partitioning from water to n-octanol is not applicable.

Persistence and Degradability

Biodegradation is not applicable.

Data for Component: **Potassium chloride**

Movement & Partitioning

Partitioning from water to n-octanol is not applicable.

Persistence and Degradability

Biodegradation is not applicable.

ECOTOXICITY

Data for Component: **Calcium chloride**

Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC₅₀, bluegill (*Lepomis macrochirus*): 8,350 - 10,650 mg/l

Aquatic Invertebrate Acute Toxicity

LC₅₀, water flea *Daphnia magna*: 759 - 3,005 mg/l

Toxicity to Micro-organisms

EC₅₀; activated sludge, respiration inhibition: > 1,000 mg/l

Data for Component: **Sodium chloride**

Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, fathead minnow (Pimephales promelas): 10,610 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, water flea Daphnia magna: 4,571 mg/l

Toxicity to Micro-organisms

IC50, OECD 209 Test; activated sludge, respiration inhibition: > 1,000 mg/l

Data for Component: **Potassium chloride**

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (Oncorhynchus mykiss): 4,236 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea Daphnia magna, 24 h, immobilization: 590 mg/l

13. Disposal Considerations

All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION:

Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Reclaimer. Landfill. Waste water treatment system. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Reclaimer. Landfill. Waste water treatment system.

Treatment and disposal methods of used packaging: Offer empty container to licensed reconditioner or crush and dispose of in compliance with all federal, state/provincial and local laws and regulations.

14. Transport Information**TDG Small container**

NOT REGULATED

TDG Large container

NOT REGULATED

IMDG

NOT REGULATED

ICAO/IATA

NOT REGULATED

15. Regulatory Information**US. Toxic Substances Control Act**

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Hazardous Products Act Information: CPR Compliance

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

Hazardous Products Act Information: WHMIS Classification

D2B	Eye or Skin Irritant
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Hazardous Products Act Information: Hazardous Ingredients

This product contains the following ingredients which are Controlled Products and/or are on the Ingredient Disclosure List (Canadian HPA Section 13 and 14).

Component	CAS #	Amount W/W
Calcium chloride	10043-52-4	91.0 - 93.0 %

16. Other Information**Recommended Uses and Restrictions**

Gas and liquid hydrocarbon dehydrating.

Revision

Identification Number: 50015 / 1002 / Issue Date 2005.09.29 / Version: 2.1

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
VOL/VOL	Volume/Volume

Dow Chemical Canada, Inc. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that its activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have

obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



Shell Canada Limited

Material Safety Data Sheet

Effective Date: 2006-04-21

Supersedes: 2003-03-05

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **LINSEED SOAP**
SYNONYMS: Lubricating Grease
PRODUCT USE: Lubricating Grease

MANUFACTURER
Shell Canada Limited
P.O. Box 100, Station M
400-4th Ave. S.W.
Calgary, AB Canada
T2P 2H5

TELEPHONE NUMBERS
Shell Emergency Number
CANUTEC 24 HOUR EMERGENCY NUMBER
For general information:
For MSDS information:
(From 7:30 to 4:30 Mountain Time)

1-800-661-7378
613-996-6666
1-800-661-1600
403-691-3982
403-691-2220

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark(s) of Shell Canada Limited, used under license by Shell Canada Products.

2. COMPOSITION / INFORMATION ON INGREDIENTS

THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.
See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Semi-Solid Paste Brown Colour Slight Hydrocarbon Odour
Routes of Exposure: Exposure will most likely occur through skin or eye contact. Inhalation is only possible if the product is heated or mists are generated.

Hazards:

This product is not expected to be irritating and has a low level of toxicity under normal use.
Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.

For further information on health effects, see Section 11.

4. FIRST AID

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.
Skin: Wipe excess from skin. Wash contaminated skin with mild soap and water for 15 minutes. If irritation occurs and persists, obtain medical attention. If material is injected under the skin, get medical attention promptly to prevent serious damage; do not wait for symptoms to develop.

- Ingestion:** Not normally required; obtain medical attention if large amounts have been ingested. Do not induce vomiting. If vomiting occurs spontaneously keep head below hips to prevent aspiration of liquid into the lungs.
- Inhalation:** Remove victim from further exposure. Additional first aid treatment is not ordinarily required.
- Notes to Physician:** In general, lubricating oils have low oral toxicity. High pressure injection under the skin may have serious consequences and may require urgent treatment.

5. FIRE FIGHTING MEASURES

- Extinguishing Media:** Dry Chemical
Carbon Dioxide
Foam
Water Fog
- Firefighting Instructions:** Material will not burn unless preheated. Caution, spilled material is slippery. Product will float and can be reignited on surface of water. Do not use a direct stream of water as it may spread fire. Use water to cool fire exposed containers. Water may be used to flush spills away from exposure. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus.
- Hazardous Combustion Products:** Carbon monoxide, carbon dioxide and dense smoke are produced on combustion.

6. ACCIDENTAL RELEASE MEASURES

Eliminate all ignition sources. Isolate hazard area and restrict access. Wear appropriate breathing apparatus (if applicable) and protective clothing. Stop leak only if safe to do so. Spilled material is slippery. Dike and contain land spills; contain water spills by booming. For large spills remove by mechanical means and place in containers. Absorb residue or small spills with absorbent material and remove to non-leaking containers for disposal. Clean area with appropriate cleaner. Dispose of recovered material as noted under Disposal Considerations. Notify appropriate environmental agency(ies).

7. HANDLING AND STORAGE

- Handling:** Avoid excessive heat, formation of oil mist, breathing of vapours and mist of hot oil and prolonged or repeated contact with skin. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.
- Storage:** Store in a cool, dry, well ventilated area, away from heat and ignition sources.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

Oil mist (mineral): 5 mg/m³ (STEL: 10 mg/m³)

- Mechanical Ventilation:** Not normally required. Local ventilation is recommended if oil mist is present or if exposure limit is exceeded. Make up air should always be supplied to balance air exhausted (either generally or locally).

PERSONAL PROTECTIVE EQUIPMENT:

- Eye Protection:** No special eye protection is routinely necessary. Wear safety glasses as appropriate.

Skin Protection: Not normally needed. Chemically-resistant gloves should be worn for frequent or prolonged contact with this product.

Respiratory Protection: Not normally required under intended conditions of use. If vaporization of oil component is occurring (i.e. under conditions of high heat), use a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter.

9. PHYSICAL DATA

Physical State:	Semi-Solid Paste	Odour:	Slight Hydrocarbon Odour
Appearance:	Brown Colour	Odour Threshold:	Not available
Pour Point, °C :	0 °C	Boiling Point, °C :	100 °C
Vapour Pressure (absolute):	Not available	Vapour Density (air = 1):	Not available
Density:	Not available	Flash Point, °C :	Not applicable
Specific Gravity (Water = 1):		Lower Explosion Limit:	Not applicable
pH:	9.5 - 11	Upper Explosion Limit:	Not applicable
Viscosity:	Not available	Autoignition Temperature, °C:	Not applicable
Evaporation Rate (n-BuAc = 1):	Not available	Partition Coefficient (K_{ow}):	Not available
Water Solubility:	Soluble	Molecular Weight:	
Other Solvents:	None Identified	Formula:	

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes	Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No	Sensitive to Static Discharge:	No
Incompatible Materials:	Avoid strong oxidizing agents.		
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.		

11. TOXICOLOGICAL INFORMATION

Routes of Exposure: Exposure will most likely occur through skin or eye contact. Inhalation is only possible if the product is heated or mists are generated.

Irritancy: This product is not a primary skin irritant after exposure of short duration, is not a skin sensitizer and is not irritating to the eyes.

Acute Toxicity: This product is not expected to be irritating and has a low level of toxicity under normal use.

Chronic Effects: Long term intensive exposure to oil mist may cause benign lung fibrosis. Prolonged and repeated contact with skin can cause defatting and drying of the skin resulting in skin irritation and dermatitis.

12. ECOLOGICAL INFORMATION

Environmental Effects: Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations require and federal regulations may require that environmental and/or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities.

Biodegradability: Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery (cement kilns, thermal power generation), 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site.

14. TRANSPORTATION INFORMATION**Canadian Road and Rail Shipping Classification:**

This product is not regulated under the Canadian Transportation of Dangerous Goods Regulations for transport by road and rail.

15. REGULATORY INFORMATION

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

DSL/NDSL Status:	THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE. This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act. This product and/or all components are listed on the U.S. EPA TSCA Inventory.
Other Regulatory Status:	No Canadian federal standard; however, for general discharge guidance, federal installations limited to 15 mg/L for total oil and grease. Provincial criteria are likely and should be requested when notifying provincial authorities.

16. ADDITIONAL INFORMATION

Revisions:	This MSDS has been reviewed and updated. Changes have been made to: Section 3 Section 4 Section 6
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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	KEROSENE	Code	W106 SAP: 100
Synonym	Kerosene 1-K, Low Sulphur Kerosene, Kerosine	Validated on	7/12/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Kerosene is a refined petroleum distillate suitable for burning in wick lamps and non-vented space heaters.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C9-C16) ** Aromatic content is 10-25% typical (benzene: nil).	8008-20-6	>99.9	200 mg/m ³	Not established	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin irritation. Not expected to cause more than slight eye irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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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: 5%
Flash Points	CLOSED CUP: >38°C (100°F) Tag (ASTM D56)	Auto-Ignition Temperature	210°C (410°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, or heat. May accumulate in confined spaces. This product can accumulate static charge and ignite. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.

Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.
Fire Fighting Media and Instructions	NAERG2000, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE 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	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Stop leak if safe to do so. Ventilate area. Ensure clean-up personnel wear appropriate personal protective equipment. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Avoid breathing vapours or mists of material. Avoid contact with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. Do not allow spilled materials to come into contact with incompatible materials (see Section 10). Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Wear proper personal protective equipment (See Section 8). Avoid contact with any incompatible or reactive materials. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Store away from heat and sources of ignition. Avoid direct sunlight. Keep container tightly closed. Store in dry, cool, well-ventilated area. Ensure the storage containers are grounded/bonded.

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	Clear liquid.	Viscosity	1.0-1.9 cSt @ 40°C (104°F).
Colour	Clear and bright.	Pour Point	<-51°C (-60°F)
Odour	Hydrocarbon solvent.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	150 to 300°C (302 to 572°F)	Penetration	Not applicable.
Density	0.8 to 0.82 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (in water)	Not available
Vapour Pressure	0.70 kPa @ 20°C (5.25 mmHg @ 68°F).	Dispersion Properties	Not available
Volatility	<1 (water = 1). Low volatility at ambient temperature and pressure, and much lower than gasoline.	Solubility	Insoluble in water. Partially miscible in some alcohols. Miscible with other petroleum 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.	Decomposition Products	May release COx, NOx, SOx, acrid 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 toxicity of the product based on actual testing: <u>Kerosene (8008-20-6):</u> Acute oral toxicity (LD50): 2835 mg/kg (rabbit).
Chronic or Other Toxic Effects	
Dermal Route:	Contact may cause skin irritation based on laboratory test results.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	Considered to be A3 by the ACGIH. (Kerosene, 8008-20-6)
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Chronic exposure to some of the hazardous components of this product may result in damage to the following organs and/or systems: kidney.

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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	KEROSENE, 3, UN1223, PGIII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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/DPD (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).																				
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)																					
HMIS (U.S.A.)	<table><tr><td>Health Hazard</td><td>(2*)</td></tr><tr><td>Fire Hazard</td><td>(2)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(H)</td></tr></table>		Health Hazard	(2*)	Fire Hazard	(2)	Reactivity	(0)	Personal Protection	(H)	NFPA (U.S.A.)	<table><tr><td rowspan="2">Health</td><td>2</td><td>Fire Hazard</td><td>2</td></tr><tr><td>2</td><td>Reactivity</td><td>0</td></tr><tr><td colspan="4">Specific hazard</td></tr></table>		Health	2	Fire Hazard	2	2	Reactivity	0	Specific hazard			
Health Hazard	(2*)																							
Fire Hazard	(2)																							
Reactivity	(0)																							
Personal Protection	(H)																							
Health	2	Fire Hazard	2																					
	2	Reactivity	0																					
Specific hazard																								
			Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																				

Section 16. Other Information

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

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
CNS - Central Nervous System	PEL - Permissible Exposure Limit
COD5 - Chemical Oxygen Demand in 5 days	RCRA - Resource Conservation and Recovery Act
CPR - Controlled Products Regulations	RTECS - Registry of Toxic Effects of Chemical Substances
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDLo/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	TLm - Median Tolerance Limit
EPA - Environmental Protection Agency	TLV-TWA - Threshold Limit Value-Time Weighted Average
EPCRA - Emergency Planning and Community Right to Know Act	TSCA - Toxic Substances Control Act
FDA - Food and Drug Administration	USEPA - United States Environmental Protection Agency
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USP - United States Pharmacopoeia
HCS - Hazard Communication Standard	WHMIS - Workplace Hazardous Material Information System
HMIS - Hazardous Material Information System	
IARC - International Agency for Research on Cancer	

For Copy of MSDSInternet: www.petro-canada.ca/msds**Fuels & Solvents:**

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 7/12/2005.

Data entry by Product Safety - DSR.

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	TDG (pictograms)
 	B-2, D-2A, D-2B	  	

Section 1. Chemical Product and Company Identification

Product Name	JET B AVIATION TURBINE FUEL	Code	W219 SAP: 150, 151, 152
Synonym	Jet B; Jet B DI; JP-4; Jet F-40; NATO F-40; Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22).	Validated on	2/8/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec 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

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C6-C14).	64741-41-9	>99	Not established	Not established	Not established
Benzene	71-43-2	<0.5	0.5 ppm	2.5 ppm	Not established
Fuel System Icing Inhibitor (FSII) (if added*): Diethylene Glycol Monomethyl Ether	111-77-3	≤0.15	Not established	Not established	Not established
Anti-static, antioxidant, corrosion inhibitor and metal deactivator additives. * Please note that Jet B DI, JP-4, Jet F-40 and NATO F-40 all contain Fuel System Icing Inhibitor (FSII).corrosion inhibitor	Not applicable	<0.1	Not applicable	Not applicable	Not applicable
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. Skin and eye contact can cause irritation. Inhalation of vapours can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Aspiration into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure. May cause cancer. May cause teratogenicity/embryotoxicity. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 5 minutes or until chemical is removed.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Immediately transport victim to an emergency care facility.

Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water.
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Note to Physician Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	LOWER: 1.3% UPPER: 8% (NFPA)
Flash Points	CLOSED CUP: -31°C (-24°F) (NFPA)	Auto-Ignition Temperature	240°C (464°F) (NFPA)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and 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	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE 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	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Ventilate area. Stop leak if safe to do so. Avoid contact with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Ensure clean-up personnel wear appropriate personal protective equipment. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Collect used absorbent for later disposal. Avoid breathing vapours or mists of material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Wear proper personal protective equipment (See Section 8). Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
Storage	Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded. Keep container tightly closed. Store in dry, cool, well-ventilated area.

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 - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i>	
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume or mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): neoprene, polyvinyl alcohol (PVA), and fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
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	Clear liquid.	Viscosity	Not available (similar to gasoline)
Colour	Clear and colourless.	Pour Point	Freezing Point: <-51°C (<-60°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 available
Vapour Density	3.5 (Air = 1)	Ionicity (in water)	Not available
Vapour Pressure	21 kPa (158 mmHg) @ 37.8°C (100°F).	Dispersion Properties	Not available
Volatility	Volatile.	Solubility	Insoluble in water. Partially miscible in some alcohols. Miscible in other petroleum 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	Can react with strong oxidizing agents, uranium hexafluoride, diborane. Incompatible with halogens and halogen compounds.	Decomposition Products	May release CO _x , NO _x , SO _x , aldehydes, ketones, 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 toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: Based on toxicity of similar product. Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >5000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >5000 mg/m ³ /4h (rat).

Benzene

Acute oral toxicity (LD50): 930 mg/kg (rat).
 Acute dermal toxicity (LD50): >9400 mg/kg (rabbit).
 Acute inhalation toxicity (LC50): 13200 ppm/4h (rat).

Diethylene Glycol Monomethyl Ether

Acute oral toxicity (LD50): 4140-5180 mg/kg (rat).
 Acute dermal toxicity (LD50): >2000 mg/kg (rabbit).
 Acute inhalation toxicity (LC50): >50000 mg/m³/4h (rat).

Chronic or Other Toxic Effects

Dermal Route:	Skin contact can cause irritation. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs).
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	Benzene is tumorigenic by RTECS criteria.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin [Diethylene Glycol Monomethyl Ether].
Carcinogenicity (ACGIH):	ACGIH A1: confirmed human carcinogen. [Benzene]
Carcinogenicity (IARC):	IARC Group 1: carcinogenic to Humans. [Benzene]
Carcinogenicity (NTP):	NTP Group 1: known to be a carcinogen. [Benzene]
Carcinogenicity (IRIS):	EPA/IRIS Class A: human carcinogen.
Carcinogenicity (OSHA):	Benzene is an OSHA known carcinogen.

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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PGII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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/DPD (Europe) Not evaluated.

HCS (U.S.A.)

CLASS: Contains material which may cause cancer.
CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).
CLASS: Toxic.
CLASS: Irritating substance.
CLASS: Target organ effects.

ADR (Europe) (Pictograms)

NOT EVALUATED FOR EUROPEAN TRANSPORT

NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.

DOT (U.S.A) (Pictograms)



HMIS (U.S.A.)

Health Hazard	(2*)
Fire Hazard	(3)
Reactivity	(0)
Personal Protection	(H)

NFPA (U.S.A.)

Health



Fire Hazard

Reactivity

Specific hazard

Rating	
0	Insignificant
1	Slight
2	Moderate
3	High
4	Extreme

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/CGA B149.2 Propane 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
CNS - Central Nervous System
COD5 - Chemical Oxygen Demand in 5 days
CPR - Controlled Products Regulations
DOT - Department of Transport
DSCL - Dangerous Substances Classification and Labeling (Europe)
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPA - Environmental Protection Agency
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System
LD50/LC50 - Lethal Dose/Concentration kill 50%
LDLo/LCLo - Lowest Published Lethal Dose/Concentration
NAERG'96 - North American Emergency Response Guide Book (1996)
NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant 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
RTECS - Registry of Toxic Effects of Chemical Substances
SARA - Superfund Amendments and Reorganization Act
SD - Single Dose
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TDLo/TCLo - Lowest Published Toxic Dose/Concentration
TLm - Median Tolerance 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

Prepared by Product Safety - JDW on 2/8/2005.

Internet: www.petro-canada.ca/msds

Data entry by Product Safety - JDW.

Fuels & Solvents:

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For Product Safety Information: (905) 804-4752

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Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
 	B-3, D-2B, (D-2A)* (See Section 15)	   	

Section 1. Chemical Product and Company Identification

Product Name	JET A/A-1 AVIATION TURBINE FUEL	Code	W213, SAP: 149
Synonym	Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Turbine Fuel, Aviation, Kerosene Type (CAN/CGSB-3.32)	Validated on	11/8/2004.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec 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. In the arctic, Jet A-1 may also be used as diesel fuel and heating oil.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C9-C16)**(Kerosene) **Aromatic content is 25% maximum (benzene: nil).	8008-20-6	99.9	200 mg/m ³ (***)	Not established	Not established
Fuel System Icing Inhibitor (FSII) (if added*): Diethylene Glycol Monomethyl Ether	111-77-3	≤0.15	Not established	Not established	Not established
Anti-static, antioxidant and metal deactivator additives. *Please note that Jet A-1-DI, JP-8, Jet F-34 and NATO F-34 all contain Fuel System Icing Inhibitor.	Not applicable	<0.1	Not applicable	Not applicable	Not applicable
Manufacturer Recommendation	***Application of this TLV is restricted to conditions in which there are negligible aerosol exposures.				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. May cause teratogenicity/embryotoxicity. Contact with this product may cause skin irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. 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 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	Quickly and gently, blot or brush away excess chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, by the clock, while holding the eyelid(s) open.
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	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. 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: 5%
Flash Points	Closed cup: >38°C (100.4°F). (Tag. Closed Cup)	Auto-Ignition Temperature	210°C (410°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and 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	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE 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	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Ventilate area. Stop leak if safe to do so. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Ensure clean-up personnel wear appropriate personal protective equipment. Collect used absorbent for later disposal. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Avoid breathing vapours or mists of material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Wear proper personal protective equipment (See Section 8). Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
Storage	Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded. Keep container tightly closed. Store in dry, cool, well-ventilated area.

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 - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i>	
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).

Respiratory A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume or mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): polyvinyl alcohol (PVA) and fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.

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	Clear liquid.	Viscosity	1.0-1.9 cSt @ 40°C (104°F)
Colour	Clear and colourless.	Pour Point	<-51°C (<-60°F)
Odour	Kerosene-like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	150 to 300°C (302 to 572°F)	Penetration	Not applicable.
Density	0.8 to 0.82 (Water = 1)	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (in water)	Not available
Vapour Pressure	0.7 kPa at 20°C (5.25 mm Hg @ 68°C)	Dispersion Properties	Not available
Volatility	Low than gasoline.	Solubility	Insoluble in water. Partially miscible in some alcohols. Miscible in other petroleum 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, nitric acid, chlorosulfonic acid and calcium hypochlorite.	Decomposition Products	May release COx, NOx, SOx, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Kerosene Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >5000 mg/m³/4h (rat). Diethylene Glycol Monomethyl Ether Acute oral toxicity (LD50): 4140-5180 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >50000 mg/m³/4h (rat).
Chronic or Other Toxic Effects	Dermal Route: This product contains a component (at >= 1%) that can cause skin irritation (Kerosene, CASRN 8008-20-6). Therefore, this product is considered to be a skin irritant. Inhalation Route: Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; headache, nausea, dizziness, light-headedness and vomiting. 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 causes irritation. Immunotoxicity: Not available Skin Sensitization: Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components. Respiratory Tract Sensitization: Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.

Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at $\geq 0.1\%$ that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests (Diethylene Glycol Monomethyl Ether, CASRN 111-77-3). Therefore, this product is considered to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	ACGIH A3: Confirmed animal carcinogen with unknown relevance to human (Kerosene, CASRN 8008-20-6)
Carcinogenicity (IARC):	IARC Group 3: Not classifiable as a human carcinogen (Kerosene, CASRN 8008-20-6).
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Chronic exposure to some of the hazardous components of this product may result in damage to the following organs and/or systems: kidney.

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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PGII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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). The WHMIS classification of Jet A/A-1 is B3, D2B. The WHMIS classification of Jet A/A-1-DI, JP-8, Jet F-34 and NATO F-34, which all contain FSI (Diethylene Glycol Monomethyl Ether), is B3, D2A, D2B. 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/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	CLASS: Combustible liquid having a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS: Irritating material. Target Organ Effects* (Only applies to: Jet A/A-1-D1, JP8, Jet F-34 and NATO F-34)

ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)																						
HMIS (U.S.A.)		<table><tr><td>Health Hazard</td><td>(2/2*)</td></tr><tr><td>Fire Hazard</td><td>(2)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(H)</td></tr></table>		Health Hazard	(2/2*)	Fire Hazard	(2)	Reactivity	(0)	Personal Protection	(H)	NFPA (U.S.A.)		<table><tr><td rowspan="2">Health</td><td>2</td><td>Fire Hazard</td></tr><tr><td>2</td><td>0</td><td>Reactivity</td></tr><tr><td colspan="2"></td><td>Specific hazard</td></tr></table>		Health	2	Fire Hazard	2	0	Reactivity			Specific hazard	Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
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	2	0	Reactivity																							
		Specific hazard																								

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/CGA B149.2 Propane 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
 CNS - Central Nervous System
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPA - Environmental Protection Agency
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazard Communication Standard
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer
 IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance 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 MSDSInternet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - TLM on 11/8/2004.

Data entry by Product Safety - RS.

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.

June 6, 2006

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0E 1J0

Dear: Ms. Beaulieu

**RE: Water License Application –
Izok and Hood Property Exploration Drilling Programs**

 I am enclosing a completed Water License Application form for diamond drilling starting this fall in the vicinity of Izok Lake in the West Kitikmeot. The planned drilling program would be part of renewed mineral exploration activity at the site following Wolfden's acquisition of the property from Inmet Mining Corporation earlier this year.

Along with the application package, we also enclose a cheque in the amount of \$30.00 payable to the Receiver General for Canada, which corresponds to the stipulated application fee.

We trust that you find the enclosed application documents complete and in good order. If you have any questions or comments, please call me at 807-346-1668.

Yours truly

For: WOLFDEN RESOURCES INC.

Andrew Mitchell, B.Sc., P.Geo.
Project Manager

AM/
Encl.



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	FUEL OIL	Code	W105 SAP: 132, 156, 286, 300
Synonym	#1 Furnace Oil, Furnace Oil 50, Seasonal Furnace Oil, Seasonal Furnace Oil Special, Economy Diesel, Stove Oil, ThermaClean.	Validated on	2/5/2004.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Fuel Oils are distillate fuels suitable for use in liquid fuel burning equipment without preheating.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
1) Mixture of petroleum distillates. Aromatic content is 50% maximum (benzene: nil).	68476-30-2, 64742-81-0	100	100 mg/m ³ (as total hydrocarbons) *	Not established	Not established
Manufacturer Recommendation	* Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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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	Open Cup: >40°C (>104°F), Cleveland.	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.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container. 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 vapours as products of incomplete combustion.		

**Fire Fighting
Media and
Instructions**

NAERG96, 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, ISOLATE 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**

Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Extinguish all ignition sources. Evacuate non-essential personnel. Ventilate area. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.

Section 7. Handling and Storage**Handling**

COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Avoid confined spaces and areas with poor ventilation. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.

Storage

Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded.

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	1.2 - 4.1 cSt @ 40°C (104°F)
Colour	Clear to yellow / brown (may be dyed for taxation purposes).	Pour Point	Not available
Odour	Mild 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	0.80 - 0.88 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (in water)	Not available
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 COx, NOx, SOx, H2S, 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 toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: <u>Fuel Oil No. 2 (68476-30-2):</u> Acute Oral toxicity (LD50): 12000 mg/kg (rat) <u>Kerosine (petroleum), hydrosulfurized (64742-81-0):</u> Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >5000 mg/m³/4h (rat)		
Chronic or Other Toxic Effects			
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.		
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.		
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.		
Eye Irritation/Inflammation:	This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.		
Immunotoxicity:	Not available		
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.		
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.		
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.		
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.		
Carcinogenicity (ACGIH):	ACGIH A3: animal carcinogen. [Diesel fuel] (See Other Considerations)		
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	* Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.		

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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	FUEL OIL, 3, UN1202, PGIII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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).																					
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DSD/DPD (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).																			
ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms) 																			
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Glossary	
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HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

For Copy of MSDS

Internet: www.petro-canada.ca/msds

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax:
1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 2/5/2004.

Data entry by Product Safety - JDW.

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	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	DURON* SINGLE GRADE ENGINE OILS SAE VISCOSITY GRADES 10W, 20, 30, 40, 50	Code	420-054, DUR1 420-055, DUR2 420-056, DUR3 420-057, DUR4 420-058, DUR5
Synonym	Not available	Validated on	10/7/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	DURON* single grade oils are intended for use in diesel and spark ignition engines according to the specific viscosity grade and performance level for each grade of product. They may also be used for wet clutch and gear type transmissions and hydraulic systems in line with equipment builder specifications.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 5 minutes or until chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts, etc.). If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT induce vomiting because of danger of aspirating liquid into lungs. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	May be combustible at high temperature.	Flammable Limits	Not available.
Flash Points	CLOSED CUP: ≥194°C (381.2°F) (Pensky-Martens) OPEN CUP: ≥205°C (401°F) (Cleveland)	Auto-Ignition Temperature	Fire Point: ≥231°C (447.8°F)
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), CaO _x , ZnO _x , PO _x , smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG2004, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Ensure clean-up personnel wear appropriate personal protective equipment. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

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	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume of mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): neoprene, nitrile, polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
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	Viscous liquid.	Viscosity	10W: 41.51 cSt @ 40°C (104°F) 20: 64.9 cSt @ 40°C (104°F) 30: 83.2 cSt @ 40°C (104°F) 40: 133.5 cSt @ 40°C (104°F) 50: 209 cSt @ 40°C (104°F)
Colour	Amber.	Pour Point	10W: -42°C (-43.6°F) 20: -39°C (-38.2°F) 30: -36°C (-32.8°F) 40: -30°C (-22°F) 50: -21°C (-5.8°F)
Odour	Mild petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available.	Dropping Point	Not applicable.
Boiling Point	Not available.	Penetration	Not applicable.
Density	0.8667 to 0.8881 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available.	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Not available	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	10W, 30, 40: Copper corrosion, 3h, 100°C (ASTM D0130): 1b. 20, 50: Copper corrosion, 3h, 100°C (ASTM D0130): 1a.		
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, acids, halogens and halogen compounds.	Decomposition Products	May release COx, NOx, SOx, POx, ZnOx, H2S, alkyl mercaptans, sulfides, aldehydes, methacrylate monomers, 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 toxicity information is not available for the product as a whole, therefore, data for the base oils are provided below: Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >2500 mg/m³/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.
Inhalation Route:	With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available.
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at ≥ 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at ≥ 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.

Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	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/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.		HCS (U.S.A.)	Does not meet the definitions of a health or physical hazard according to the OSHA - Hazard Communication Standard. (United States)																			
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)	Not evaluated for transport Non évalué pour le transport																			
HMIS (U.S.A.)	<table><tr><td>Health Hazard</td><td>(1)</td></tr><tr><td>Fire Hazard</td><td>(1)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(B)</td></tr></table>		Health Hazard	(1)	Fire Hazard	(1)	Reactivity	(0)	Personal Protection	(B)	NFPA (U.S.A.)	<table><tr><td rowspan="3">Health</td><td>1</td><td>Fire Hazard</td><td>1</td></tr><tr><td>1</td><td>Reactivity</td><td>0</td></tr><tr><td colspan="2">Specific hazard</td></tr></table>	Health	1	Fire Hazard	1	1	Reactivity	0	Specific hazard		Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
Health Hazard	(1)																						
Fire Hazard	(1)																						
Reactivity	(0)																						
Personal Protection	(B)																						
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	1	Reactivity	0																				
	Specific hazard																						

Section 16. Other Information

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

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
CNS - Central Nervous System	PEL - Permissible Exposure Limit
COD5 - Chemical Oxygen Demand in 5 days	RCRA - Resource Conservation and Recovery Act
CPR - Controlled Products Regulations	RTECS - Registry of Toxic Effects of Chemical Substances
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSDL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDLo/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	TLm - Median Tolerance Limit
EPA - Environmental Protection Agency	TLV-TWA - Threshold Limit Value-Time Weighted Average
EPCRA - Emergency Planning and Community Right to Know Act	TSCA - Toxic Substances Control Act
FDA - Food and Drug Administration	USEPA - United States Environmental Protection Agency
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USP - United States Pharmacopoeia
HCS - Hazard Communication Standard	WHMIS - Workplace Hazardous Material Information System
HMIS - Hazardous Material Information System	
IARC - International Agency for Research on Cancer	

For Copy of MSDS

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564
Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 10/7/2005.

Data entry by Product Safety - RS.

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	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	DURATRAN* XL	Code	DTRANXL, 460-644-0
Synonym	Not available	Validated on	10/23/2003.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	A synthetic blend, extended season transmission / hydraulic fluid for use in a wide range of ambient conditions with exceptional low temperature performance. Suitable for transmission, hydraulic, wet brake, PTO, final drive and power steering units in mobile equipment.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked base oil (petroleum), synthetic hydrocarbons and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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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	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: 219°C (426.2°F) (Cleveland)	Auto-Ignition Temperature	Fire Point: 239°C (462.2°F)
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), CaO _x , ZnO _x , phosphorus compounds (PO _x), smoke and irritating vapours as products of incomplete combustion.		

Fire Fighting Media and Instructions

NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO₂. LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.

Section 6. Accidental Release Measures**Material Release or Spill**

Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.

Section 7. Handling and Storage**Handling**

Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid eye contact. Avoid skin contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.

Storage

Store away from incompatible and reactive materials (See section 5 and 10). Keep container tightly closed. Store in dry, cool, well-ventilated area.

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	Viscous liquid.	Viscosity	39.21 cSt @ 40°C (104°F), 8.34 cSt @ 100°C (212°F), VI=196
Colour	Yellow/amber.	Pour Point	-49.8°(-57.6°F)
Odour	No odour or slight petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.8503 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Copper corrosion, 3h, 149°C (ASTM D0130M): 1b.		
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 COx, SOx, POx, H2S, CaOx, ZnOx, SiOx, aldehydes, alkyl mercaptans, sulfides, methacrylate monomers, 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 toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >2500 mg/m³/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.
Inhalation Route:	With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	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/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.		HCS (U.S.A.)	Does not meet the definitions of a health or physical hazard according to the OSHA - Hazard Communication Standard. (United States)																				
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		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>1</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>B</td></tr></table>		Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protection	B	NFPA (U.S.A.)	<table><tr><td rowspan="2">Health</td><td>1</td><td>Fire Hazard</td><td>1</td></tr><tr><td>1</td><td>Reactivity</td><td>0</td></tr><tr><td colspan="4">Specific hazard</td></tr></table>		Health	1	Fire Hazard	1	1	Reactivity	0	Specific hazard			
Health Hazard	1																							
Fire Hazard	1																							
Reactivity	0																							
Personal Protection	B																							
Health	1	Fire Hazard	1																					
	1	Reactivity	0																					
Specific hazard																								
			Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																				

Section 16. Other Information

References	Available upon request. * Marque de commerce de Petro-Canada - Trademark
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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/CGA B149.2 Propane 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
 CNS - Central Nervous System
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations

IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration

Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPA - Environmental Protection Agency
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

TLm - Median Tolerance 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

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564

Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285

Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 10/23/2003.

Data entry by Product Safety - RS.

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	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	DRILL ROD HEAVY GREASE	Code	650-265, DRODH
Synonym	Not available	DSL	See Section 15
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	TSCA	See Section 15
Material Uses	This product is recommended for the lubrication of diamond drill rods.	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients

			<i>Exposure Limits (ACGIH)</i>		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 5 minutes or until chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts, etc.). If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	Mineral Oil Blend: OPEN CUP: 252°C (485.6°F). (Cleveland).	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container.
Products of Combustion	Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion.		

Fire Fighting Media and Instructions	NAERG2004, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO2. LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.
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Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Keep container tightly closed. Store in dry, cool, well-ventilated area.

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 -	<i>The selection of personal protective equipment varies, depending upon conditions of use.</i>
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A minimum of NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume of mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Neoprene, Nitrile, Polyvinyl alcohol (PVA), Fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.
Exposure Limits	This product is not expected to form a mist based on its properties and expected use.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Paste of long fibred texture.	Viscosity	Mineral Oil Blend: 155.5 cSt @ 40°C (104°F), 14.42 cSt @ 100°C (212°F), VI=89
Colour	Dark greenish-brown	Pour Point	Mineral Oil Blend: -15°C (5°F)
Odour	Mild grease like.	Softening Point	Not available
Odour Threshold	Not available	Dropping Point	201°C (394°F)
Boiling Point	Not available	Penetration	234 (60 strokes)
Specific Gravity	Mineral Oil Blend: 0.8898 kg/L @ 15°C (59°F).	Oil / Water Dist. Coeff.	Not available
Vapor Density	Not available	Ionicity (in water)	Not available
Vapor Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Not corrosive to copper.		
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, acids and alkalis.	Decomposition Products	May release CO _x , NO _x , SO _x , diphenylamine, alkenes, 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 toxicity information is not available for the product as a whole, therefore, data for the base oils are provided below: Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit)		
Chronic or Other Toxic Effects			
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.		
Inhalation Route:	With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.		
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.		
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.		
Immunotoxicity:	Not available		
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.		
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.		
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.		
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.		
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.		
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.		
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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	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. 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/DPD (Europe)	Not evaluated.										
DSD/DPD (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	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>1</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>B</td></tr></table>	Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protection	B	NFPA (U.S.A.)	Health 1 1 0 Fire Hazard Reactivity Specific hazard
Health Hazard	1										
Fire Hazard	1										
Reactivity	0										
Personal Protection	B										

Section 16. Other Information

References	Available upon request. * Marque de commerce de Petro-Canada - Trademark
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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 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 COD - Chemical Oxygen Demand CPR - Controlled Products Regulations DOT - Department of Transportation (U.S.A.) DSCL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substance or Dangerous Preparations Directives (Europe) DSL - Domestic Substance List (Canada) EEC/EU - 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 HMIS - Hazardous Material Information System IARC - International Agency for Research on Cancer IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant 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 Reorganization Act STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration TLV-TWA - Threshold Limit Value-Time Weighted Average TLM - Median Tolerance Limit TSCA - Toxic Substances Control Act USEPA - United States Environmental Protection Agency USP - United States Pharmacopoeia WHMIS - Workplace Hazardous Material Information System
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Information Contact	Lubricants: Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564 Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285 Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285
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Prepared by Product Safety - JDW on 2/26/2005.

Data entry by Product Safety - JDW.

For Product Safety Information: (905) 804-4752

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	TDG (pictograms)
 	B-3, D-2B	   	

Section 1. Chemical Product and Company Identification

Product Name	DIESEL FUEL	Code	W104, W293 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, Naval Distillate, Ultra Low Sulphur Diesel, ULS Diesel, Mining Diesel, Mining Diesel Special, Mining Diesel Special LS, High Flash Mining Diesel, Furnace Oil, Stove Oil.	Validated on	8/17/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 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. Mining Diesel has a higher flash point requirement, for safe use in underground mines.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Diesel oil.	68334-30-5	>99.9	100 mg/m ³ (as total hydrocarbons) *	Not established	Not established
Proprietary additives.	Not available	<0.1	Not established	Not established	Not established
Aromatic content is 50% maximum (benzene: nil). Sulphur content is 0-0.50%.					
Manufacturer Recommendation	* Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 15 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.

Ingestion NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.

Note to Physician Not available

Section 5. Fire-fighting Measures

Flammability	Class II - combustible liquid (NFPA).	Flammable Limits	LOWER: 0.7%, UPPER: 6% (NFPA)
Flash Points	Diesel Fuel: Closed Cup: >40°C (>104°F) Marine Diesel Fuel: Closed Cup: >60°C (>140°F) Mining Diesel: Closed Cup: 52°C (126°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. See Section 11 (Other Considerations) for information regarding the toxicity of the combustion products.		
Fire Fighting Media and Instructions	NAERG96, 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, ISOLATE 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	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Extinguish all ignition sources. Stop leak if safe to do so. Ventilate area. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Evacuate non-essential personnel. Ensure clean-up personnel wear appropriate personal protective equipment. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated. Avoid confined spaces and areas with poor ventilation. Ensure all equipment is grounded/bonded. Wear proper personal protective equipment (See Section 8).
Storage	Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded.

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 - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i>	
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material. 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	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): nitrile, neoprene, polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
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 (may be dyed for taxation purposes).	Pour Point	Variable, -50°C to 0°C (-58°F to -32°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	0.80 - 0.85 kg/L @ 15°C (59°F)	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (in water)	Not applicable.
Vapour Pressure	Not available	Dispersion Properties	Not available
Volatility	Semivolatile to volatile.	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 COx, NOx, SOx, H2S, H2O, 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:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis. (See Other Considerations)
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	This product contains a component (at $\geq 1\%$) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	ACGIH A3: animal carcinogen. [Diesel oil] (See Other Considerations)
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer. Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	DIESEL FUEL, 3, UN1202, PGIII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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.
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Please contact Product Safety for more information.

DSD/DPD (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).		
ADR (Europe) (Pictograms) NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms) Not evaluated for transport Non évalué pour le transport		
HMIS (U.S.A.)	Health Hazard (2*)	NFPA (U.S.A.) Health	2 2 0 Fire Hazard Reactivity Specific hazard	Rating 0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
	Fire Hazard (2)			
	Reactivity (0)			
	Personal Protection (H)			

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/CGA B149.2 Propane 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
 CNS - Central Nervous System
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPA - Environmental Protection Agency
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazard Communication Standard
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer
 IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance 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

Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 8/17/2005.

Data entry by Product Safety - JDW.

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	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	DEXRON® III/MERCON® AUTOMATIC TRANSMISSION FLUID	Code	460-601, DEXRON
Synonym	Not available	Validated on	11/22/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Automatic transmission fluid for most North American automobiles and for off-highway torque converters requiring C-4 type transmission fluid. It is also suitable as a hydraulic fluid and as a top-up in power steering systems. Not to be used in conditions where aerosols could be generated.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 5 minutes or until chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts, etc.). If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: ≥180°C (356°F) (Cleveland)	Auto-Ignition Temperature	Fire Point: 205°C (401°F)

Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid eye contact. Avoid skin contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Keep container tightly closed. Store in dry, cool, well-ventilated area.

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	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A minimum of NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume or mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Neoprene, Nitrile, Polyvinyl alcohol (PVA), Fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
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	Viscous liquid.	Viscosity	34.26 cSt @ 40°C (104°F), 7.7 cSt @ 100°C (212°F), VI=210.
Colour	Dark red.	Pour Point	-51°C (-59.8°F).
Odour	Mild petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.855 kg/L @ 15°C(59°F) 7.14 lbs/US gal @ 15°C(59°F)	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Copper corrosion, 3h, 149°C (ASTM D0130): 1b.		
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, reducing agents and acids.	Decomposition Products	May release COx, NOx, metallic oxides, 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 toxicity information is not available for the product as a whole, therefore, data for the base oils are provided below: Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2500 mg/m³/4h (rat).		
Chronic or Other Toxic Effects			
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.		
Inhalation Route:	With its relatively low vapour pressure, this product is not expected be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.		
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.		
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.		
Immunotoxicity:	Not available		
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.		
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.		
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.		
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.		
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.		
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	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).																																								
	German Water Hazard Classification (Verwaltungsvorschrift wassergefährdende Stoffe - VwVwS) WGK=2																																								
	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/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.		HCS (U.S.A.)	Does not meet the definitions of a health or physical hazard according to the OSHA - Hazard Communication Standard. (United States)																																					
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)	Not evaluated for transport Non évalué pour le transport																																					
HMIS (U.S.A.)	<table><tr><td>Health Hazard</td><td>(1)</td></tr><tr><td>Fire Hazard</td><td>(1)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(B)</td></tr></table>		Health Hazard	(1)	Fire Hazard	(1)	Reactivity	(0)	Personal Protection	(B)	NFPA (U.S.A.)	<table><tr><td rowspan="2">Health</td><td>1</td><td rowspan="2">Fire Hazard</td><td rowspan="2">Rating</td><td rowspan="2">0 Insignificant</td></tr><tr><td>1</td><td>0</td><td>Reactivity</td></tr><tr><td colspan="3">Specific hazard</td><td></td><td>1 Slight</td></tr><tr><td colspan="3"></td><td></td><td>2 Moderate</td></tr><tr><td colspan="3"></td><td></td><td>3 High</td></tr><tr><td colspan="3"></td><td></td><td>4 Extreme</td></tr></table>	Health	1	Fire Hazard	Rating	0 Insignificant	1	0	Reactivity	Specific hazard				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	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
CNS - Central Nervous System	PEL - Permissible Exposure Limit
COD5 - Chemical Oxygen Demand in 5 days	RCRA - Resource Conservation and Recovery Act
CPR - Controlled Products Regulations	RTECS - Registry of Toxic Effects of Chemical Substances
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDLo/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	TLm - Median Tolerance Limit
EPA - Environmental Protection Agency	TLV-TWA - Threshold Limit Value-Time Weighted Average
EPCRA - Emergency Planning and Community Right to Know Act	TSCA - Toxic Substances Control Act
FDA - Food and Drug Administration	USEPA - United States Environmental Protection Agency
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USP - United States Pharmacopoeia
HCS - Hazard Communication Standard	WHMIS - Workplace Hazardous Material Information System
HMIS - Hazardous Material Information System	
IARC - International Agency for Research on Cancer	

For Copy of MSDS

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564

Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285

Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 11/22/2005.

Data entry by Product Safety - JDW.

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	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	BARIMOL HEAVY GREASE	Code	650-119, BARH
Synonym	Not available.	DSL	See Section 15
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	TSCA	See Section 15
Material Uses	This product is a multi-purpose, barium soap based grease with a wide range of automotive and industrial lubricant applications.	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
1) Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established

Section 3. Hazards Identification.

Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. 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. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment. 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	May be combustible at high temperature.	Flammable Limits	Not available.
Flash Points	Mineral Oil Blend: OPEN CUP: 230°C (446°F) (Cleveland)	Auto-Ignition Temperature	Not available.
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 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. SMALL FIRE: use DRY chemicals, foam, or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

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.
Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits. This product is not expected to form a mist based on its properties and expected use.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Paste of long fibred texture.	Viscosity	Mineral Oil Blend: 101.36 cSt @ 40°C (104°F), 10.71 cSt @ 100°C (212°F), VI=89
Colour	Dark grey.	Pour Point	Mineral Oil Blend: -18°C (0°F)
Odour	Mild grease like.	Softening Point	Not available.
Odour Threshold	Not available.	Dropping Point	239°C (462°F)
Boiling Point	Not available.	Penetration	299 (60 strokes)
Specific Gravity	Mineral Oil Blend: 0.8896 kg/L @ 15°C (59°F)	Oil / Water Dist. Coeff.	Not available
Vapor Density	Not available.	Ionicity (in water)	Not available
Vapor Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non to semivolatle.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Not corrosive to copper.		
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, acids, alkalis, metals and peroxides.	Decomposition Products	May release COx, NOx, SOx, diphenylamine, alkenes, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, ingestion.
Acute Lethality	Based on toxicity of components. Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2500 mg/m ³ /4h (rat).
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.
Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Oral Route:	Low toxicity; has laxative effect.
Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient 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:	Based on actual test results of base oils and results of similar products, severely hydrotreated base oils give negative results when tested for: (a) Salmonella Typhimurium TA98 using the Modified Ames Assay for Petroleum Product; (b) Salmonella-Escherichia coli/Mammalian-Microsome Reverse Mutation Assay (Ames test) with a Confirmatory Assay; (c) Structural Chromosomal Aberrations in Chinese Hamster Ovary (CHO) Cells.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as A1 or A2 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	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.

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/DPD (Europe)

Not classified under the Dangerous Substances or Dangerous Preparations Directives.

DSD/DPD (Europe) (Pictograms)**DOT (U.S.A) (Pictograms)****HMIS (U.S.A.)**

Health Hazard	1
Fire Hazard	1
Reactivity	0
Personal Protection	B

NFPA (U.S.A.)**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/CGA B149.2 Propane 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
 DSCCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - 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
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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 Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance 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

Information Contact Internet: www.petro-canada.ca

Lubricants:
Western Canada, telephone: 1-800-661-1199;
fax: (780) 464-9564
Ontario & Central Canada, telephone:
1-800-268-5850 and (905) 822-4222; fax:
1-800-201-6285
Quebec & Eastern Canada, telephone:
1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 5/2/2003.**Data entry by Product Safety - JDW.**

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	TDG (pictograms)
 	B-2, D-2B	   	

Section 1. Chemical Product and Company Identification

Product Name	AVIATION GASOLINE 100LL	Code	060-100LL, W118
Synonym	AVGAS 100LL	Validated on	5/30/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	This product is used as fuel for internal combustion aircraft engines.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of aliphatic and aromatic hydrocarbons (C4-C12).	68527-27-5	85-95	Not established	Not established	Not established
Toluene	108-88-3	5-15	50 ppm	Not established	Not established
Contains 0-0.56g/L of lead [from Tetraethyl Lead].					
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 20 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	LOWER: 1.4%, UPPER: 7.6%
Flash Points	Closed Cup: -50°C (-58°F), Tag, ASTM D56.	Auto-Ignition Temperature	257°C (494.6°F)
Fire Hazards in Presence of Various Substances	Easily ignites under almost all normal temperature conditions. Flammable in presence of open flames, sparks, shocks, heat, oxidizing materials. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapours may form explosive mixtures with air. Runoff to sewer may create fire or explosion hazard.
Products of Combustion	Carbon oxides (CO, CO ₂), reactive hydrocarbons, aldehydes, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG2004, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE 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, CO ₂ , 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	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Notify appropriate authorities immediately. Evacuate non-essential personnel. Ensure clean-up personnel wear appropriate personal protective equipment. Extinguish all ignition sources. Ventilate area. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Do not allow spilled materials to come into contact with incompatible materials (see Section 10). Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary.
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Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Do not ingest this product. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid contact with any incompatible or reactive materials. Avoid confined spaces and areas with poor ventilation. Ensure all equipment is grounded/bonded. Ensure container is securely closed when not in use. Wear proper personal protective equipment (See Section 8). Exercise caution when washing/drying clothing contaminated with flammable materials. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning.
Storage	Store as flammable material. Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Store in a dry, cool and well-ventilated area.

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	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): polyvinyl alcohol (PVA) and fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.

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	Clear liquid.	Viscosity	Not available
Colour	Bright Blue.	Pour Point	Not applicable.
Odour	Gasoline.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	30 to 170°C (86 to 338°F)	Penetration	Not applicable.
Density	0.69 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not measurable. The product is more soluble in oil.
Vapour Density	Heavier than air.	Ionicity (in water)	Insoluble in water.
Vapour Pressure	38 kPa @ 20°C (285 mmHg @ 68°F).	Dispersion Properties	Not available
Volatility	Volatile.	Solubility	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform, and benzene. Dissolves fats, oils and natural resins.

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 oxidizing agents, acids, tetranitromethane, uranium hexafluoride and sulfur dichloride.	Decomposition Products	May release COx, aldehydes, 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 toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: <u>Toluene (108-88-3):</u> Acute Oral toxicity (LD50): 636 mg/kg (rat) Acute Dermal toxicity (LD50): 12225 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 8800 ppm/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any. This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.

Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	There is a wealth of information about the teratogenic hazards of Toluene in the literature; however, based upon professional judgement regarding the body of evidence, WHMIS classification as a teratogen is not warranted.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as A1, A2 or A3 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	GASOLINE, 3, UN1203, PGII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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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.																																							
		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/DPD (Europe)		Not evaluated.		HCS (U.S.A.)	CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F). CLASS: Irritating substance. CLASS: Target organ effects.																																				
ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)	Not evaluated for transport Non évalué pour le transport																																				
HMIS (U.S.A.)		<table><tr><td>Health Hazard</td><td>(2*)</td></tr><tr><td>Fire Hazard</td><td>(4)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr><tr><td>Personal Protection</td><td>(H)</td></tr></table>		Health Hazard	(2*)	Fire Hazard	(4)	Reactivity	(0)	Personal Protection	(H)	NFPA (U.S.A.)		<table><tr><td rowspan="2">Health</td><td rowspan="2">2</td><td rowspan="2">4</td><td rowspan="2">Fire Hazard</td><td rowspan="2">Rating</td><td rowspan="2">0 Insignificant</td></tr><tr><td>0</td><td>Reactivity</td><td>1 Slight</td></tr><tr><td colspan="4">Specific hazard</td><td></td><td>2 Moderate</td></tr><tr><td colspan="4"></td><td></td><td>3 High</td></tr><tr><td colspan="4"></td><td></td><td>4 Extreme</td></tr></table>	Health	2	4	Fire Hazard	Rating	0 Insignificant	0	Reactivity	1 Slight	Specific hazard					2 Moderate						3 High						4 Extreme
Health Hazard	(2*)																																								
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Section 16. Other Information**References**

Available upon request.

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Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
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 CPR - Controlled Products Regulations
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 EPA - Environmental Protection Agency
 EPCRA - Emergency Planning and Community Right to Know Act
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 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazard Communication Standard
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer

IRIS - Integrated Risk Information System
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 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant 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
 RTECS - Registry of Toxic Effects of Chemical Substances
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance 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 MSDSInternet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 5/30/2005.

Data entry by Product Safety - JDW.

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	TDG (pictograms)
	D-2A, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	PETRO-CANADA ANTIFREEZE	Code	W269
Synonym	Universal Antifreeze, Radiator Antifreeze, Diesel Antifreeze, Petro-Canada Antifreeze-Coolant, Petro-Canada Heavy Duty Antifreeze-Coolant, Pre-Mix Antifreeze, Petro-Canada Premium Radiator Antifreeze, Diesel Engine Coolant, Pre-Mixed Radiator Antifreeze/Coolant Petro-Canada.	Validated on	5/11/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Used as an engine antifreeze coolant.		

Section 2. Composition and Information on Ingredients

			<i>Exposure Limits (ACGIH)</i>		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Ethylene glycol	107-21-1	≥45	Not established	Not established	100 mg/m ³ (aerosol)
Sodium tetraborate pentahydrate (Diesel Engine Coolant only)	12179-04-3	≤5	1 mg/m ³	Not established	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Contact with this product may cause eye irritation. Not expected to cause more than slight skin irritation. Inhalation of this product may cause respiratory tract irritation. Ingestion may be extremely hazardous. May cause teratogenicity/embryotoxicity. May cause damage to reproductive organs. For more information refer to Section 11 of this MSDS.
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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	May be combustible at high temperature.	Flammable Limits	Lower: 3.2%, Upper: 15.3%
Flash Points	Closed Cup: 116°C (241°F) (Tagliabue) Open Cup: 116°C (241°F) (Cleveland)	Auto-Ignition Temperature	413°C (775°F)
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container.

Products of Combustion	Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion.
Fire Fighting Media and Instructions	NAERG2004, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ventilate area. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid breathing vapours or mists of material. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid confined spaces and areas with poor ventilation. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Do not ingest this product. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Store away from heat and sources of ignition. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

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	Chemical splash goggles should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
Respiratory	A minimum of NIOSH-approved air-purifying respirator with a organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Neoprene, Polyvinyl chloride (PVC). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
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	Clear viscous liquid.	Viscosity	Not available
Colour	Green.	Pour Point	Not available
Odour	Odourless.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	129 to 197°C (264 to 387°F)	Penetration	Not applicable.
Density	1.07 to 1.145 (Water = 1)	Oil / Water Dist. Coefficient	Not available

PETRO-CANADA ANTIFREEZE		Page Number: 3	
Vapour Density	2.1 (Air=1).	Ionicity (in water)	Not available
Vapour Pressure	0.06 mmHg @ 20°C (68°F).	Dispersion Properties	Not available
Volatility	0% (w/w)	Solubility	Soluble in water, methanol and diethyl ether.

Section 10. Stability and Reactivity			
Corrosivity	Not available		
Stability	The product is stable.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids, alkalis, perchloric acid, phosphorus and silvered copper wires carrying DC current.	Decomposition Products	May release COx, acrid smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information	
Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	<u>Ethylene glycol (107-21-1):</u> LD50: 4700 mg/kg (oral/rat). LD50: 9530 mg/kg (dermal/rabbit). <u>Sodium tetraborate pentahydrate (12179-04-3):</u> LD50: 3200-3500 mg/kg (oral/rat) (Boric acid). [Sodium tetraborate pentahydrate]
Chronic or Other Toxic Effects	
Dermal Route:	Short-term exposure is expected to cause only slight irritation, if any.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation.
Oral Route:	Extremely dangerous in case of ingestion.
Eye Irritation/Inflammation:	This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	Borates are possible reproductive toxins based upon available animal ingestion studies in several species. These studies usually involved high doses, over prolonged periods of time. A human study following occupational exposure to borate by inhalation concluded that, no adverse effects to reproduction were found in this population, under the conditions of this study.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin (Ethylene glycol).
Carcinogenicity (ACGIH):	ACGIH A4: not classifiable as a human carcinogen (Ethylene glycol). This product is not known to contain any chemicals at reportable quantities that are listed as Group A1, A2, or A3 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	The substance may be toxic to kidneys and liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

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.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations		All of the components of this product are on the Domestic Substances List (DSL), are considered to be on the DSL, or are exempt from the New Substance Notification (NSN) requirements.																											
		All components of this formulation are listed on the US EPA-TSCA Inventory.																											
		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/DPD (Europe)		Not evaluated.		HCS (U.S.A.)		CLASS: Target organ effects. CLASS: Irritating substance.																							
ADR (Europe) (Pictograms)		NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.		DOT (U.S.A) (Pictograms)																									
HMIS (U.S.A.)		<table><tr><td>Health Hazard</td><td>2*</td></tr><tr><td>Fire Hazard</td><td>1</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>H</td></tr></table>		Health Hazard	2*	Fire Hazard	1	Reactivity	0	Personal Protection	H	NFPA (U.S.A.)		<table><tr><td rowspan="2">Health</td><td>1</td><td>Fire Hazard</td></tr><tr><td>2</td><td>0</td></tr><tr><td></td><td></td><td>Reactivity</td></tr><tr><td></td><td></td><td>Specific hazard</td></tr></table>		Health	1	Fire Hazard	2	0			Reactivity			Specific hazard	Rating		0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
Health Hazard	2*																												
Fire Hazard	1																												
Reactivity	0																												
Personal Protection	H																												
Health	1	Fire Hazard																											
	2	0																											
		Reactivity																											
		Specific hazard																											

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/CGA B149.2 Propane 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 CNS - Central Nervous System COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSCCL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe) DSL - Domestic Substance List EEC/EU - European Economic Community/European Union EINECS - European Inventory of Existing Commercial Chemical Substances IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NAERG'96 - North American Emergency Response Guide Book (1996) NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant 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 RTECS - Registry of Toxic Effects of Chemical Substances SARA - Superfund Amendments and Reorganization Act SD - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration Tlm - Median Tolerance Limit TLV-TWA - Threshold Limit Value-Time Weighted Average TSCA - Toxic Substances Control Act USEPA - United States Environmental Protection Agency USP - United States Pharmacopoeia

EPA - Environmental Protection Agency
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

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Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

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Prepared by Product Safety - JDW on 5/11/2005.

Data entry by Product Safety - RS.

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Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	2-CYCLE MOTOR OIL	Code	460-401, TWOCYC
Synonym	Not available	Validated on	4/9/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	A low ash 2-cycle engine oil designed to lubricate conventional pre-mixed fuel/oil as well as oil injection lubricated engines powering air-cooled two-stroke cycle engines.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed. If irritation persists, obtain medical advice.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with water and non-abrasive soap for 5 minutes or until chemical is removed. Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts, etc.). If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: $\geq 130^{\circ}\text{C}$ (266°F) (Cleveland)	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.

Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), acrid fumes, smoke and irritating vapours as products of incomplete combustion.
Fire Fighting Media and Instructions	NAERG2004, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. 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. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Ensure clean-up personnel wear appropriate personal protective equipment. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid eye contact. Avoid skin contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Keep container tightly closed. Store in dry, cool, well-ventilated area.

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	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A minimum of NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume or mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. A NIOSH-approved positive-pressure, air-supplied respirator or self-contained breathing apparatus may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Neoprene, Nitrile, Polyvinyl alcohol (PVA), Fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
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	Viscous liquid.	Viscosity	21.1 cSt @ 40°C (104°F), 4.5 cSt @ 100°C (212°F), VI=127
Colour	Blue-green	Pour Point	<-54°C
Odour	Hydrocarbon.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.88 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (in water)	Not available

2-CYCLE MOTOR OIL		Page Number: 3	
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile.	Solubility	Insoluble in water.

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.	Decomposition Products	May release CO _x , NO _x , methacrylate monomers, aldehydes, 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 toxicity information is not available for the product as a whole, therefore, data for the base oils are provided below: Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2300 mg/m ³ /4h (rat).
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.
Inhalation Route:	With its relatively low vapour pressure, this product is not expected be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.
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):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
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.		

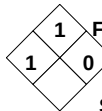
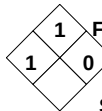
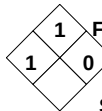
Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	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).																																
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		Please contact Product Safety for more information.																																
DSD/DPD (Europe)		Not classified under the Dangerous Substances or Dangerous Preparations Directives.		HCS (U.S.A.)		Does not meet the definitions of a health or physical hazard according to the OSHA - Hazard Communication Standard. (United States)																												
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>1</td></tr><tr><td>Reactivity</td><td>0</td></tr><tr><td>Personal Protection</td><td>B</td></tr></table>		Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protection	B	NFPA (U.S.A.)		<table><tr><td rowspan="4">Health</td><td rowspan="4"></td><td>Fire Hazard</td><td>Rating</td><td>0 Insignificant</td></tr><tr><td>Reactivity</td><td></td><td>1 Slight</td></tr><tr><td></td><td></td><td>2 Moderate</td></tr><tr><td>Specific hazard</td><td></td><td>3 High</td></tr><tr><td></td><td></td><td></td><td></td><td>4 Extreme</td></tr></table>		Health		Fire Hazard	Rating	0 Insignificant	Reactivity		1 Slight			2 Moderate	Specific hazard		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/CGA B149.2 Propane 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 CNS - Central Nervous System COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSCL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NAERG'96 - North American Emergency Response Guide Book (1996) NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant 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 RTECS - Registry of Toxic Effects of Chemical Substances SARA - Superfund Amendments and Reorganization Act SD - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration

Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPA - Environmental Protection Agency
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

TLM - Median Tolerance 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

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564

Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285

Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - RS on 4/9/2005.

Data entry by Product Safety - RS.

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	TDG (pictograms)
 	B-2, D-2A, D-2B	   	

Section 1. Chemical Product and Company Identification

Product Name	GASOLINE, UNLEADED	Code	W102E
Synonym	Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, Super Premium (94 RO)	Validated on	7/4/2005.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Gasoline	8006-61-9	85-100	300 ppm	500 ppm	Not established
Methyl tert-butyl ether	1634-04-4	0-15	50 ppm	Not established	Not established
Benzene	71-43-2	<1.5	0.5 ppm	2.5 ppm	Not established
Note: Petro-Canada does not use MTBE in the manufacturing of its gasoline, however MTBE can be introduced from time to time through the use of external gasoline blendstocks.					
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. May cause cancer. May cause heritable genetic effects (mutagenicity). This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Contact with this product may cause skin and eye irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 20 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.

Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	Lower: 1.3%; Upper: 7.6% (NFPA).
Flash Points	Closed Cup: -50 to -38°C (-58 to -36°F), ASTM D56 Standard Test Method for Flash Point by Tag Closed Tester.	Auto-Ignition Temperature	257°C (495°F) (NFPA).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), polynuclear aromatic hydrocarbons, phenols, smoke and irritating vapours as products of incomplete combustion. See Section 11 (Other Considerations) for information regarding the toxicity of the combustion products.		
Fire Fighting Media and Instructions	NAERG2004 GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE 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, CO ₂ , 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	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Evacuate non-essential personnel. Ventilate area. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Avoid breathing vapours or mists of material. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Do not ingest this product.
Storage	Store as flammable material. Store away from incompatible and reactive materials (See section 5 and 10). Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Keep container tightly closed. Ensure the storage containers are grounded/bonded. Avoid direct sunlight.

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 - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i>	
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
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	Clear liquid.	Viscosity	Not available
Colour	Clear to slightly yellow, undyed liquid. May be dyed red for taxation purposes.	Pour Point	Not applicable.
Odour	Gasoline. MTBE has a terpene-like odour.	Softening Point	Not applicable.
Odour Threshold	Less than 1 ppm.	Dropping Point	Not applicable.
Boiling Point	25 to 220°C (77 to 428°F) Initial boiling point by ASTM D86 Standard Test Method.	Penetration	Not applicable.
Density	0.685 - 0.80 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	3 to 4 (Air = 1) (NFPA).	Ionicity (in water)	Not available
Vapour Pressure	<107 kPa @ 37.8°C (100°F)	Dispersion Properties	Not available
Volatility	Volatile.	Solubility	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform, and benzene. Dissolves fats, oils and natural resins.

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	Reactive with oxidizing agents, acids, interhalogens and uranium hexafluoride.	Decomposition Products	May release COx, NOx, phenols, polynuclear aromatic hydrocarbons, acrid smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.
Acute Lethality	<u>Gasoline (8006-61-9):</u> Acute Oral toxicity (LD50): 13600 mg/kg (rat) Acute Dermal toxicity (LD50): >5000 mg/kg (rabbit) <u>MTBE (1634-04-4):</u> Acute Oral toxicity (LD50): 2963 mg/kg (rat) Acute Dermal toxicity (LD50): >6800 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 23576 ppm/4h (rat)

Benzene (71-43-2):

Acute Oral toxicity (LD50): 930 mg/kg (rat)

Acute Dermal toxicity (LD50): >9400 mg/kg (rabbit)

Acute Inhalation toxicity (LC50): 13229 ppm/4h (rat)

Chronic or Other Toxic Effects

Dermal Route:	Contact may cause skin irritation. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	Contact may cause eye irritation.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product contains a component(s) at $\geq 0.1\%$ that has been shown to cause mutagenicity in laboratory tests. Therefore, this product is considered to be a mutagen. (Benzene)
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product contains the following chemical(s) at $\geq 0.1\%$ that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be A1 by the ACGIH. Benzene (71-43-2)] [Considered to be A3 by the ACGIH. Gasoline (8006-61-9), MTBE (1634-04-4)]
Carcinogenicity (IARC):	This product contains the following chemical(s) at $\geq 0.1\%$ that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic to humans (group 1) by IARC. Benzene (71-43-2)] [Considered to be carcinogenic to humans (group 2B) by IARC. Gasoline (8006-61-9)]
Carcinogenicity (NTP):	This product contains the following chemical(s) at $\geq 0.1\%$ that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Known to be a human carcinogen according to NTP. Benzene (71-43-2)]
Carcinogenicity (IRIS):	This product contains the following chemical(s) at $\geq 0.1\%$ that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic by IRIS. Benzene (71-43-2)]
Carcinogenicity (OSHA):	This product contains the following chemical(s) at $\geq 0.1\%$ that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic by OSHA. Benzene (71-43-2)]

Other Considerations	Gasoline engine exhaust is possibly carcinogenic to humans (IARC Group 2B).
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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.		

Section 13. Disposal Considerations

Waste Disposal Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification GASOLINE, 3, UN1203, PGII (CL-TDG)	Special Provisions for Transport See Transportation of Dangerous Goods Regulations.
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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.

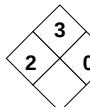
All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

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/DPD (Europe) Not evaluated.	HCS (U.S.A.) CLASS: Contains material which may cause cancer. CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F). CLASS: Irritating substance. CLASS: Target organ effects.
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ADR (Europe) (Pictograms) NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms) Not evaluated for transport Non évalué pour le transport
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HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>(2*)</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	(2*)	Fire Hazard	(3)	Reactivity	(0)	Personal Protection	(H)	NFPA (U.S.A.)	 <table border="1"> <tr> <td>Fire Hazard</td> <td>Rating</td> <td>0 Insignificant</td> </tr> <tr> <td>Reactivity</td> <td></td> <td>1 Slight</td> </tr> <tr> <td></td> <td></td> <td>2 Moderate</td> </tr> <tr> <td></td> <td></td> <td>3 High</td> </tr> <tr> <td></td> <td></td> <td>4 Extreme</td> </tr> </table>	Fire Hazard	Rating	0 Insignificant	Reactivity		1 Slight			2 Moderate			3 High			4 Extreme
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Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
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CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
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CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
CNS - Central Nervous System	PEL - Permissible Exposure Limit
COD5 - Chemical Oxygen Demand in 5 days	RCRA - Resource Conservation and Recovery Act
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DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCl - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
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HMIS - Hazardous Material Information System	

IARC - International Agency for Research on Cancer

For Copy of MSDSInternet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 7/4/2005.

Data entry by Product Safety - JDW.

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