ENERFLEX

102, 85 Freeport Blvd N.E.
Calgary, Alberta
T3J 4X8

Tel: (403)-736-2700
Fax: (403)-736-2772
www.enerflex.com

S5-100

LUBRICANT

Material Safety Data Sheet

Not controlled under WHMIS (Canada)

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **S5-100**

Supplier: Enerflex Ltd.
102, 85 Freeport Blvd. NE
Calgary, Alberta
T3J 4X8

Synonym: Hydrotreated

Chemical Name: Semi-Synthetic Hydrocarbon

Chemical Family: Mineral Oil

Formula: Proprietary

In Case of Emergency:

CPI Engineering Services, Inc.

Emergency Number: 989-496-3780

Manufacturer: CPI Engineering Services, Inc.
2300 James Savage Rd.
Midland, MI 48642

SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

Name: No hazardous ingredients

TLV: 5 mg/m^3 (oil mist)

SECTION 3: HAZARDS INDENTIFICATION

This product is non-hazardous. The product contains no known carcinogens. No special warning labels are required under OSHA 29 CFR 1910.1200.

Emergency Number: (989) 496-3780

The information in this material safety data sheet should be provided to all who use, handle, store, transport, or are otherwise exposed to this product. CPI believes the information in this document to be reliable and up to date as of the date of publication, but makes no guarantee that it is.

SECTION 4: FIRST AID MEASURES

Situations to Avoid: Avoid breathing oil mists

Threshold limit value: 5mg/m^3 for oil mist

First aid procedures:

Ingestion:
- DO NOT INDUCE VOMITING.
- Consult physician at once.
- DO NOT give anything by mouth if the person is unconscious or having convulsions.

Inhalation:
- Product is not toxic by inhalation.
- If oil mist is inhaled, remove to fresh air and consult physician.

Contact:
- Prolonged exposure may irritate the skin.
- Wash exposed skin with soap and water.

To the best of our knowledge, the toxicological properties of these compounds have not been fully investigated. Analogous compounds are considered to be essentially non-toxic.

SECTION 5: FIRE-FIGHTING MEASURES

Auto-ignition Temperature: No data

Flash Points: CLEVELAND OPEN CUP: 226-302°C (440-575°F)

Flammable Limits: Not established

Hazardous decomposition products: Analogous compounds evolve carbon monoxide, carbon dioxide, and other unidentified fragments when burned.

Fire fighting media and instructions: Use DRY chemicals, CO2, foam.

Special Remarks on fire hazards:
- Burning fluid may evolve irritating/noxious fumes.
- Firefighters should use NIOSH/MNSA - approved self-contained breathing apparatus.
- Use water carefully to cool fire-exposed containers.
- Spraying water directly on hot or burning liquid may cause splashing or frothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

In case of spill:
- Wear suitable protective equipment, especially goggles.
- Stop source of spill. Dike spill area.
- Use absorbent materials to soak up fluid (i.e. sand, sawdust, or commercially available materials).
- Wash spill area with large amounts of water.
- Properly dispose of all materials.

Emergency Number: (989) 496-3780

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SECTION 7: HANDLING AND STORAGE

Handling:
- Do not take internally.
- Avoid contact with skin, eyes, and clothing.
- Upon contact with skin, wash with soap and water.
- Flush eyes with water for 15 minutes and consult physician.
- Wash contaminated clothing before use.

Storage: Keep container tightly sealed when not in use.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:	Use in well ventilated area.
Ventilation:	Local exhaust.
Protective gloves:	Not required, but recommended, especially for long term exposure.
Eye/face protection:	Goggles

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Liquid (Viscous liquid)
Boiling Point:	>500° F
Specific Gravity:	0.88 (Water =1)
Vapor pressure:	<0.1 mmHg @20°C
Volatiles % by volume:	0%
Odor:	Slight
Solubility in water:	Insoluble
Evaporation Rate (butyl acetate =1:	Nil

Emergency Number: (989) 496-3780

The information in this material safety data sheet should be provided to all who use, handle, store, transport, or are otherwise exposed to this product. CPI believes the information in this document to be reliable and up to date as of the date of publication, but makes no guarantee that it is.

SECTION 10: STABILITY AND REACTIVITY

Stability:	The product is stable.
Instability temperature:	Not available.
Conditions to avoid:	Avoid excessive heat.
Incompatibility with various substances:	Strong Oxidizers
Decomposition products:	Analogous compounds evolve carbon monoxide, carbon dioxide, and other unidentified fragments when burned. See Section 5.
Hazardous polymerization:	Will not occur

SECTION 11: TOXICALOGICAL INFORMATION

To the best of our knowledge, the toxicological properties of these compounds have not been fully investigated. Analogous compounds are considered to be essentially non-toxic.

SECTION 12: ECOLOGICAL INFORMATION

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal: Incinerate this product and all associated wastes in a licensed facility in accordance with Federal, State, and local regulations.

SECTION 14: TRANSPORT INFORMATION

No data available.

Emergency Number: (989) 496-3780

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SECTION 15: REGULATORY INFORMATION AND PICTOGRAMS

Other regulations:

Other classifications: WHMIS (Canada) – Not controlled under WHMIS (Canada).
DSD/DPD (EEC) – Not controlled under DSCL (Europe).

WHMIS (Canada)
(Pictograms)

HMIS (USA):	Health Hazard	(0)	NFPA (USA):
	Fire Hazard	(1)	
	Reactivity	(0)	
	Personal Protection	(a)	

SECTION 15: *(Cont.)* REGULATORY INFORMATION AND PICTOGRAMS

DSD/DPD (Europe)
(Pictograms)

TDG (Canada)
(Pictograms)

DOT (USA)
(Pictograms)

Protective Clothing
(Pictograms)

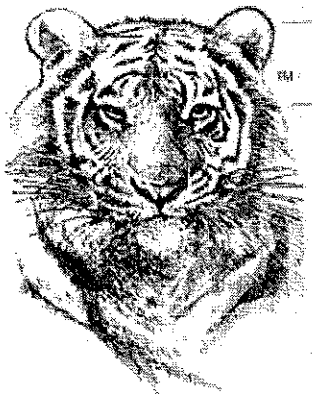
Emergency Number: (989) 496-3780

The information in this material safety data sheet should be provided to all who use, handle, store, transport, or are otherwise exposed to this product. CPI believes the information in this document to be reliable and up to date as of the date of publication, but makes no guarantee that it is.

CANADA – Barlow
– Feb 8 2010

Esso Imperial Oil

Product Data Sheet



ESSOLUBE GMA PLUS

NATURAL GAS ENGINE OIL

April 2009

New and Improved ESSOLUBE GMA PLUS natural gas engine oil, offers the following features and benefits:

- **Excellent control of piston and ring zone deposits that can cause high oil consumption and result in premature cylinder wear**
- **Good control of combustion chamber deposits, especially valve stem varnish and lacquer, that can lead to premature head failures**
- **Optimized ash level that protects against excessive valve recession**
- **Good antiwear and antiscuff properties**
- **Long oil drain intervals, as demonstrated by excellent control of viscosity, oxidation, nitration and the build-up of corrosive acids (TAN increase) in the used oil**
- **Compatibility with materials in exhaust catalysts and oil coolers**

Primary Applications

Imperial Oil is proud to introduce New and Improved ESSOLUBE GMA PLUS 40, our premium low ash natural gas engine oil with a 0.57 mass % sulphated ash (SASH). ESSOLUBE GMA PLUS 40 is the prime recommendation of Imperial Oil for Caterpillar and Waukesha engines, in natural gas service.

ESSOLUBE GMA PLUS 15W-40 has been formulated to improve cold starting ability and is our prime recommendation for Cummins engines, with the exception of Models B & C engines. For Cummins Models B & C engines, our primary recommendation is Busgard GEO 15W-40. However, we have observed good performance using Essolube GMA PLUS 15W-40 in Cummins B & C engines, when it comes to controlling viscosity increase and oxidation and nitration.

Performance Features

ESSOLUBE GMA PLUS is formulated using high quality petroleum base stocks and a proprietary balanced additive package to provide excellent control of viscosity increase, oxidation, and nitration and the build-up of corrosive acids in the used oil. Other features include excellent protection against lacquer and varnish deposits on critical engine parts and an optimized additive package that provides good control of valve recession, bearing corrosion and engine wear.

Precautions

ESSOLUBE GMA PLUS is manufactured from quality petroleum base stocks, blended with

selected additives. As with all petroleum products, good personal hygiene and careful handling should always be practiced. Avoid prolonged contact with the skin, splashing into the eyes, ingestion, or vapour inhalation. Please refer to the Esso Material Safety Data Sheet for further information.

Note: This product is not controlled under Canadian WHMIS legislation.

Typical Properties

SAE Grade	40	15W-40
Kinematic Viscosity		
cSt @ 40°C	115	108
cSt @ 100°C	13.2	14.4
Viscosity Index	110	135
CCS Viscosity @ -20 °C, cP	-	6,300
ASTM Colour	5.5	2.5
Flash Point, °C	240	218
Pour Point, °C	-21	- 30
Sulphated Ash, mass %	0.57	0.57
Total Acid Number	1.0	1.0
Total Base Number	6.0	5.0
Phosphorus, ppm	300	300
Zinc, ppm	325	325

The values shown above are representative of current production. Some are controlled by manufacturing and performance specifications while others are not. All may vary within modest ranges.

Lubricants and Specialties, Marketing Technical Services
Helplines: 1-800-268-3183

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **ESSOLUBE GMA PLUS 40**
Product Description: Base Oil and Additives
MSDS Number: 17678
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Products Division**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	519-339-2145
Transportation Emergency Phone Number	519-339-2145
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines see Section 15.

HEALTH EFFECTS

Low order of toxicity. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0
HMIS Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Eye Contact

Flush thoroughly with water. If irritation occurs, get medical assistance.

Ingestion

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulphur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: 260C (500F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

Notification Procedures

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

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist

before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists / aerosols can occur, the following are recommended: 5 mg/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Colour: Amber
Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.875
Flash Point [Method]: 260C (500F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 288C (550F)
Vapour Density (Air = 1): > 2 at 101 kPa
VAPOUR PRESSURE: < 0.013 kPa (0.1 mm Hg) at 20°C
Evaporation Rate (N-Butyl Acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 13.2 cSt (13.2 mm²/sec) at 100C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

Pour Point: -21°C (-6°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitising in test animals.

Additional information is available by request.

CMR Status: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

Regulatory Disposal Information

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG) : Not Regulated for Land Transport

LAND (DOT) : Not Regulated for Land Transport

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Not controlled

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

CEPA: All components of this material are either on the Canadian Domestic Substances List (DSL), exempt, or have been notified under CEPA.

National Chemical Inventory Listing: AICS, IECSC, ENCS, KECI, PICCS, TSCA
Special Cases:

Inventory	Status
ELINCS	Restrictions Apply
NDSL	Restrictions Apply

The Following Ingredients are Cited on the Lists Below: None.

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2
3 = TSCA 5e
4 = TSCA 6
5 = TSCA 12b
6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 04: First Aid Eye - Header was modified.
Section 04: First Aid Ingestion - Header was modified.
Section 05: Fire Fighting Measures - Fire Fighting Instruction was modified.
Section 06: Notification Procedures - Header was modified.
Section 13: Disposal Considerations - Disposal Recommendations was modified.
Section 13: Empty Container Warning was modified.
Section 09: Phys/Chem Properties Note was modified.
Section 11: Ingestion Acute Lethality - Header was modified.
Section 09: Boiling Point C(F) was modified.
Section 09: Evaporation Rate was modified.
Section 09: Flash Point C(F) was modified.
Section 09: n-Octanol/Water Partition Coefficient was modified.
Section 08: Hand Protection was modified.
Section 09: Vapour Pressure - Header was modified.

Section 09: Vapour Pressure was modified.
Section 07: Handling and Storage-Handling was modified.
Hazard Identification: Health Hazards was modified.
Section 11: Dermal Lethality Test Data was modified.
Section 11: Oral Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 06: Accidental Release- Spill Management- Water was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flammable Limits - LEL was modified.
Section 09: Flash Point C(F) was modified.
Section 09 Viscosity was modified.
Section 15: National Chemical Inventory Listing - Header was modified.
Section 15: National Chemical Inventory Listing was modified.
Section 16: MSN,MAT ID was modified.
Section 15: Special Cases Table was modified.
Section 09: Flammable Limits -UEL was modified.
Section 11: Tox Table - Header was modified.
Section 11: Other Health Effects Header was modified.
Section 09: Pour Point - Header was added.
Section 09: Pour Point C(F) was added.
Composition: No components was added.
Section 13: Regulatory Disposal Information - Header was added.
Section 13: Regulatory Disposal Information - Header was deleted.
Section 09: Vapour Pressure was deleted.
Composition: No components was deleted.
Section 11: Chronic Tox - Product was deleted.
Section 09: Form - Header was deleted.
Section 09: Physical State was deleted.

WHMIS Classification: Not controlled

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DGN: 5016258 (1016796)

Prepared By: Imperial Oil Limited, IH and Product Safety

CANADA – Barlow
– Feb 8 2010

NORKOOL™ Industrial Coolants

Introducing New Premium Coolants and Inhibitors for Today's Requirements

NORKOOL™ Coolants have always set the Oil & Gas Industry standard for protection, performance, and long-term operating economics. But now we've raised the bar even higher: Introducing a new line of NORKOOL Propylene Glycol (PG)-based Coolants and patented anti-scaling technology—providing you with more coolant options and better protection than ever before.

New NORKOOL LTC PG-Based Coolants—These new PG-based coolants provide you with outstanding protection against cavitation erosion, corrosion, and circulating system freeze up, but with the low toxicity and reduced environmental concern of a PG-based product.

Improved Corrosion Protection—All NORKOOL coolants are now enhanced with patented Dow anti-scaling technology, which, combined with phosphate- and nitrite-based corrosion inhibitors, provides long-term protection of cast iron, copper alloys and solders, even when elevated levels of chloride, sulfate, or water hardness are present.

The Most Trusted Coolants for Oil & Gas Industry Service

NORKOOL industrial coolants and circulating system maintenance products from The Dow Chemical Company set the highest standards in the Oil & Gas Industry for quality, performance, technical expertise and service.

Dow has been the world's premier supplier of heat transfer fluids for more than 75 years. With back-integration to key raw materials and a broad distribution network, we can supply the product you need, when and where you need it.

A Wide Range of Applications

NORKOOL coolants are premium industrial coolants, widely used for…

- Cooling of large stationary engines (natural gas compression)
- Cooling of field compression units (natural gas gathering systems)
- Natural gas line heaters
- LNG vaporizers
- Well-head heaters
- Combustion air pre-heaters

NORKOOL coolants are supported by our most comprehensive analytical program and experienced technical staff. If you require high-end fluid performance and analytical support, choose a NORKOOL coolant.

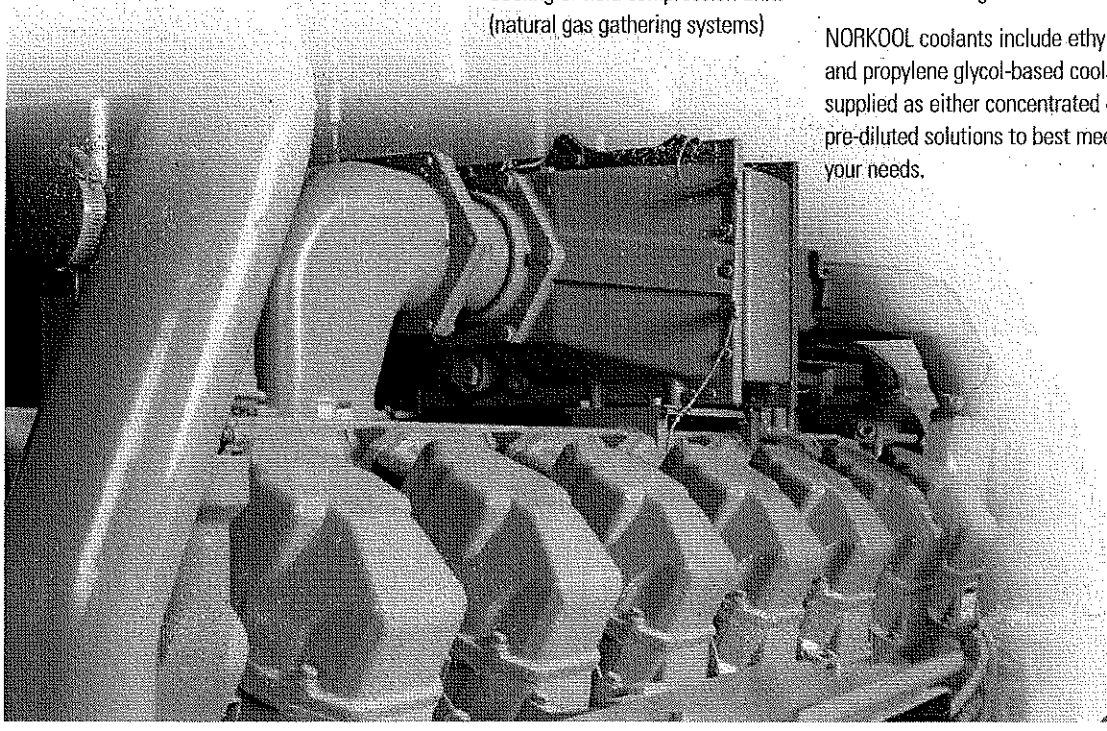
The NORKOOL Advantage

With NORKOOL coolants, you get:

- Excellent freeze and burst protection
- Broad operating range: -60° F to 275° F
- Superior corrosion protection using patented Dow technology
- Fast, accurate, comprehensive analytical service
- Technical support from system design to system operation and troubleshooting

NORKOOL coolants include ethylene and propylene glycol-based coolants, supplied as either concentrated or pre-diluted solutions to best meet your needs.

Coolants



Announcing New NORKOOL LTC PG-based Coolants

Choose the Right Coolant for Your Application

Ethylene Glycol-based Coolants	Description
NORKOOL SLH	concentrate
NORKOOL SLH50	pre-diluted 50vol% as EG
NORKOOL SLH40	pre-diluted 40vol% as EG
NORKOOL SLH30	pre-diluted 30vol% as EG

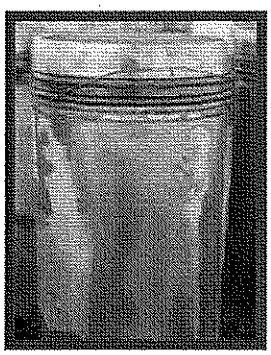
Propylene Glycol-based Coolants	Description
NORKOOL LTC	concentrate
NORKOOL LTC50	pre-diluted 50vol% as PG
NORKOOL LTC40	pre-diluted 40vol% as PG
NORKOOL LTC30	pre-diluted 30vol% as PG

Circulating System Maintenance Products

Replacement Inhibitors	Application
NORKOOL Corrosion Inhibitor 213	for pH adjustment
NORKOOL Corrosion Inhibitor 216	phosphate based re-inhibitor
NORKOOL HTF Corrosion Inhibitor 219	azole based re-inhibitor
NORKOOL HTF Corrosion Inhibitor 231	phosphate & nitrite based re-inhibitor
NORKOOL Corrosion Inhibitor 234	nitrite based re-inhibitor

System Cleaners/Degreasers	Application
NORKOOL System Cleaner	Mixture of chelating agents for rust and scale removal
NORKOOL System Degreaser	Mixture of nonionic and anionic surfactants for grease removal

NORKOOL Coolants Protect Against Cavitation Corrosion



After 14,400 hours **with** NORKOOL coolant – no cylinder liner cavitation corrosion

After 5,500 hours **without** NORKOOL coolant – cavitation and liner perforation

To Learn More...

For more information about NORKOOL industrial coolants, or the location of the distributor nearest you, contact Dow toll-free at:

1-800-447-4369 (U.S. and Canada)

Or call 989-832-1560 (Other Global Areas)

www.norkool.com

Printed in March, 2005

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Form No. 180-01494-0305AMS

Material Safety Data Sheet

LA1233
Norkool® SLH 50% Premix

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA1233
Product Name: Norkool® SLH 50% Premix
Synonyms: None
Chemical Family: Glycols
Application: Intended as a heat transfer fuild for closed-loop systems.

Distributed By:
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Prepared By: The Safety, Health and Environment Department of Univar Canada Ltd.
Preparation date of MSDS: 28 January 2010
Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666
® Indicates a trademark of the Dow Chemical Company.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
Ethylene Glycol 107-21-1	30-60	Oral LD50 (Rat) = 4000 mg/kg Dermal LD50 (Rabbit) = 9530 µL/kg
Water 7732-18-5	30-60	Oral LD50 (Rat) >90 mL/kg
Dipotassium phosphate 7758-11-4	1-5	Not available.
Sodium Nitrite 7632-00-0	0.1-1	Inhalation LC50 (Rat) = 5.5 mg/L 4 h Oral LD50 (Rat) = 85 mg/kg
1,4-dioxane 123-91-1	0.01	Oral LD50 (Rat) = 4200 mg/kg Inhalation LC50 (Rat) = 48.5 mg/L 4 h Dermal LD50 (Rabbit) = 7600 mg/kg
Ethylene Oxide 75-21-8	0.01	Oral LD50 (Rat) = 72 mg/kg
Propylene Oxide 75-56-9	0.01	Oral LD50 (Rat) = 520 mg/kg

Note: Remainder of the ingredients are non-hazardous.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:

Eye Contact: Liquid, vapor, or mist causes irritation, experienced as stinging, excess blinking and tear production, with excess redness of the conjunctiva.

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

Inhalation: Mist may irritate nose and throat. High vapor concentrations caused, for example, by heating the material in an enclosed and poorly ventilated workplace, may produce nausea, vomiting, headache, dizziness, and irregular eye movements.

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

4. FIRST AID MEASURES

Eye Contact: In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder before reuse. Get medical attention if irritation persists.

Inhalation: Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.

Ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.

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

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

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

5. FIRE FIGHTING MEASURES

Flash Point: None.
Flash Point Method: Pensky-Martens Closed Cup
Autoignition Temperature: Not available.
Flammable Limits in Air (%): Not Available.
Extinguishing Media: Apply alcohol-type or all-purpose-type foams by manufacturers' recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.
Special Exposure Hazards: During a fire, ammonia and nitrogen-containing compounds may be produced.
Hazardous Decomposition/Combustion Materials (under fire conditions): Carbon monoxide. Carbon dioxide. Ammonia and nitrogen-containing compounds.
Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.
NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, INSTABILITY 0
HMIS RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.
Environmental Precautionary Measures: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Consult local authorities.
Procedure for Clean Up: Isolate hazard area and restrict access. Absorb with an inert dry material and place in an appropriate waste disposal container. Avoid direct contact with material.

7. HANDLING AND STORAGE

Handling: Do not swallow. Avoid contact with eyes, skin and clothing. Avoid breathing aerosols. Avoid breathing vapor. Keep the containers closed when not in use. Use with adequate ventilation. Wash thoroughly after handling. For industrial use only.
Storage: Store in a cool, dry, well ventilated area, away from heat and ignition sources. Place away from incompatible materials. Store in accordance with good industrial practices.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

General (mechanical) room ventilation may be adequate, if handled at ambient temperatures or in covered equipment. If ambient temperatures are exceeded or operations exist which may produce mist, aerosol or vapor, local exhaust ventilation or other engineering controls may be required.

Respiratory Protection: If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. NIOSH-approved atmosphere-supplying respirator or a NIOSH-approved air-purifying respirator with organic vapor cartridge and dust/mist pre-filter is recommended.

Gloves:

Natural rubber gloves. Neoprene gloves. Nitrile gloves. Polyvinylchloride (PVC) gloves.

Skin Protection: Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance.

Eyes: Chemical goggles; also wear a face shield if splashing hazard exists.

Other Personal Protection Data: Ensure that eyewash stations and safety showers are proximal to the work-station location.

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Ethylene Glycol	100 mg/m^3 Ceiling	125 mg/m^3 Ceiling 50 ppm Ceiling	Not Available.
Water	Not available.	Not available.	Not Available.
Dipotassium phosphate	Not available.	Not available.	Not Available.
Sodium Nitrite	Not available.	Not available.	Not Available.
1,4-dioxane	20 ppm TLV-TWA	25 ppm TWA 90 mg/m^3 TWA	500 ppm
Ethylene Oxide	1 ppm TLV-TWA	Not available.	800 ppm
Propylene Oxide	2 ppm TLV-TWA	20 ppm TWA 50 mg/m^3 TWA	400 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.
Colour: Green
Odour: Mild
pH Not Available.
Specific Gravity: 1.079
Boiling Point: Not Available.
Freezing/Melting Point: -38°C / -36°F
Vapour Pressure: 13 mmHg
Vapour Density: 1
% Volatile by Volume: 98 Wt%
Evaporation Rate: 0.79
Solubility: 100%
VOCs: Not Available.
Viscosity: Not Available.
Molecular Weight: Not Available.
Other: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: WARNING: Do not mix this product with nitrites or other nitrosating agents because a nitrosamine may be formed. Nitrosamines may cause cancer.
Materials to Avoid: Strong acids and bases. Explosive decomposition may occur if combined with strong acids or strong bases and subjected to elevated temperatures. Materials reactive with hydroxyl compounds.
Hazardous Decomposition Products: Carbon monoxide. Carbon dioxide. Ammonia and nitrogen-containing compounds.

10. STABILITY AND REACTIVITY

Additional Information:

No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

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

Skin Contact: No evidence of harmful effects from available information.
Inhalation: Mist may irritate nose and throat. High vapor concentrations caused, for example, by heating the material in an enclosed and poorly ventilated workplace, may produce nausea, vomiting, headache, dizziness, and irregular eye movements.
Eye Contact: Liquid, vapor, or mist causes irritation, experienced as stinging, excess blinking and tear production, with excess redness of the conjunctiva.

Additional Information: Repeated skin contact with ethylene glycol may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material.Repeated inhalation of ethylene glycol may produce signs of central nervous system involvement, particularly dizziness and nystagmus (involuntary eye movement). Exposure may place individuals with existing heart problems at added risk of potential cardiac irregularities and heart failure. In animals , effects have been reported on the following organs: Kidney, liver. May aggravate an existing kidney disease.

Acute Test of Product:
Acute Oral LD50: Not Available.
Acute Dermal LD50: Not Available.
Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Ethylene Glycol	Not listed.	A4
Water	Not listed.	Not listed.
Dipotassium phosphate	Not listed.	Not listed.
Sodium Nitrite	Not listed.	Not listed.
1,4-dioxane	Group 2B	A3
Ethylene Oxide	Group 1	A2
Propylene Oxide	Group 2B	A3

Carcinogenicity Comment: Contains nitrites which may react with amines to form nitrosamines. Some nitrosamines have been shown to be carcinogenic in laboratory animals.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect doses for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations of 150, 1000 and 2500 mg/m^3 for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m^3) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m^3). The no-effects concentration (based on maternal toxicity) was 500 mg/m^3. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen. There is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity. Exposure to high aerosol concentrations is only minimally effective in producing developmental toxicity.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Ethylene Glycol	LC50 96 h (Oncorhynchus mykiss) 41000 mg/L LC50 96 h (Oncorhynchus mykiss) 14-18 ml/L static LC50 96 h (Lepomis macrochirus) 27540 mg/L static LC50 96 h (Oncorhynchus mykiss) 40761 mg/L static LC50 96 h (Pimephales promelas) 40000-60000 mg/L static LC50 96 h (Poecilia reticulata) 16000 mg/L static LC50 96 h (Oncorhynchus mykiss) 41000 mg/L	Not Available.	EC50 96 h Pseudokirchneriella subcapitata 6500 - 13000 mg/L
Water	Not Available.	Not Available.	Not Available.
Dipotassium phosphate	Not Available.	Not Available.	Not Available.
Sodium Nitrite	LC50 96 h (Oncorhynchus mykiss) 0.19 mg/L flow-through LC50 96 h (Oncorhynchus mykiss) 0.092-0.13 mg/L flow-through LC50 96 h (Oncorhynchus mykiss) 0.4-0.6 mg/L semi-static LC50 96 h (Oncorhynchus mykiss) 0.65-1 mg/L static LC50 96 h (Pimephales promelas) 2.3 mg/L flow-through LC50 96 h (Pimephales promelas) 20 mg/L static	Not Available.	LC50 (Daphnia Magna) 43.6 mg/L (24hr)
1,4-dioxane	LC50 96 h (Lepomis macrochirus) >10000 mg/L static LC50 96 h (Lepomis macrochirus) >10000 mg/L semi-static LC50 96 h (Pimephales promelas) 9850 mg/L flow-through LC50 96 h (Pimephales promelas) 10306-14742 mg/L static LC50 96 h (Lepomis macrochirus) >10000 mg/L static	Not Available.	Not Available.
Ethylene Oxide	LC50 96 h (Pimephales promelas) 73-96 mg/L	Not Available.	Not Available.

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Propylene Oxide	LC50 96 h (Lepomis macrochirus) 215 mg/L static	Not Available.	EC50 96 h Pseudokirchneriella subcapitata 240 mg/L

Other Information:
No additional remark.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.
Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):
DOT Shipping Name: Not Regulated.
DOT Hazardous Class Not Applicable.
DOT UN Number: Not Applicable.
DOT Packing Group: Not Applicable.
DOT Reportable Quantity (lbs): Not Available.
Note: No additional remark.
Marine Pollutant: No.

TDG (Canada):
TDG Shipping Name: Not Regulated.
Hazard Class: Not Applicable.
UN Number: Not Applicable.
Packing Group: Not Applicable.
Note: No additional remark.
Marine Pollutant: No.

15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Ethylene Glycol	Not Listed.	Listed	Listed
Water	Not Listed.	Not Listed.	Not Listed.
Dipotassium phosphate	Not Listed.	Not Listed.	Not Listed.
Sodium Nitrite	Not Listed.	Listed	Listed
1,4-dioxane	Not Listed.	Listed	Listed
Ethylene Oxide	Listed	Listed	Listed
Propylene Oxide	Listed	Listed	Listed

California Proposition 65: Listed.
MA Right to Know List: Listed.
New Jersey Right-to-Know List: Listed.
Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:
D2A VERY TOXIC MATERIALS
D2B TOXIC MATERIALS

16. OTHER INFORMATION

Additional Information: 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.

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*****END OF MSDS*****