

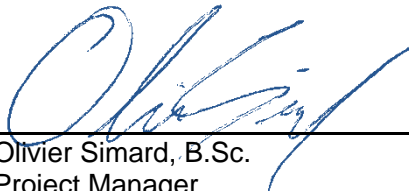
**24-hours
Qikiqtaaluk Environmental Inc.
Contact:
867-222-8194**

SPILL CONTINGENCY PLAN


ENVIRONMENTAL WASTE PROCESSING FACILITY LOT 666, PLAN 1673, PARCELS Q AND O

**Qikiqtaaluk Environmental Inc.
PO Box 1228
Iqaluit (Nunavut) X0A 0H0**

Prepared by:


Olivier Simard, B.Sc.
Project Manager

Verified and approved by:


Greg Johnson, P.Eng., M.Sc.A.
Project Director



February 2016

O/Ref.: QE15-102-1

PREAMBLE

This Emergency and Spill Response Plan for the Environmental Waste Processing Facility in Iqaluit will be in effect upon commencement of operations, and applies to all related activities onsite.

The Plan will be updated and revised, as necessary, if operations are modified or if the type and quantity of stored waste changes.

Formal distribution of the Plan has been made to:

Department of Environment - Environmental Protection Division

PO Box 1000 Station 1300
Iqaluit (Nunavut) X0A 0H0
Tel: 867 975-7700
Fax: 867 975-7742

Aboriginal Affairs and Northern Development Canada

969 Qimugjuk Building, 2nd Floor
PO Box 2200
Iqaluit (Nunavut) X0A 0H0
Tel: 867 975-4517
Fax: 867 979-6445

City of Iqaluit

PO Box 460
Iqaluit (Nunavut) X0A 0H0
Tel: 867 979-5600
Fax: 867 979-5922

Additional copies and updates of this Plan may be obtained from:

Qikiqtaaluk Environmental Inc.

Attn.: Olivier Simard, Project Manager
9935 Catania Avenue – Suite 200
Brossard (Quebec) J4Z 3V4
Tel: 867 222-8194
osimard@qenv.ca

TABLE OF CONTENTS

1. GENERAL	3
2. HAZARDOUS MATERIALS – TRANSPORT AND STORAGE.....	6
3. DUTIES AND RESPONSIBILITIES	9
4. TRAINING AND DRILLS	12
5. MATERIALS AND EQUIPMENT	13
6. SPILL RESPONSE PROCEDURES.....	14
6.1 Spills on Land	15
6.3 Spills on Snow	15
6.4 Disposal of Spilled Material.....	16
7. POTENTIAL SPILL ANALYSIS.....	17
8. REPORTING REQUIREMENTS	19

LIST OF TABLES

Table 1:	Estimated Waste Storage Capacity	7
Table 2:	QE Management Contact Information	9
Table 3:	Spill Kit Content	13
Table 4:	Contact List for Spill Reporting	19

LIST OF FIGURES

Figure 1:	Location of Hazardous Waste Management Facility.....	4
Figure 2:	Spill Response Team Organizational Chart.....	11

LIST OF APPENDICES

APPENDIX A: MSDS of Liquid Hazardous Waste Stored On-site
APPENDIX B: Spill Response Flowchart
APPENDIX C: Standard Nunavut Spill Report Form

1. GENERAL

The spill contingency plan (Plan) was developed to assist with implementing measures to protect the environment and minimize impacts from spill events. It provides precise instructions to guide all Qikiqtaaluk Environmental Inc. (QE) personnel in emergency spill response situations. The Plan outlines procedures for responding to spills while minimizing potential health and safety hazards, environmental damage, and clean-up costs.

This Plan is required as part of the implementation of an Environmental Waste Processing Facility (EWPF) in Iqaluit, Nunavut. The following activities will be conducted at the EWPF:

- Receiving and handling (loading-off-loading) of waste materials contained primarily in 205 L drums;
- Consolidation of small containers (cans, bottles, pails, etc.) inside larger containers (drums, waste wranglers) to form lab packs;
- Storage of waste drums and wranglers placed outdoors in the storage yard or in 20 ft marine containers;
- Crushing of fluorescent tubes using specialized equipment;
- Puncturing and drainage of aerosol cans using specialized equipment;
- Placement of drums and wranglers on pallets and securing with strapping, prior to sealift;
- Treatment of contaminated water through a water filtration unit;
- Treatment of hydrocarbons contaminated soils through physical, chemical and biological techniques.

The EWPF will be located on the West 40 site on Iqaluit Lane, in Iqaluit, more specifically: Lot 666, Plan 1673, Parcels O and Q (coordinates of central point 63°44'38.22" N, 68°32'58.59" W). A drainage ditch is located along the lot limits of the Site. Drainage ditches flow into the City of Iqaluit's municipal drainage pathway which, in time, flows toward the ocean, approximately 700 m from the Site. Figure 1 presents a general overview of the Site.

Waste management activities will take place in areas designed to control run-off or contact water, to minimize contaminant dispersion and to contain accidental spills. A large lined water collection pond will be available to accept possible contaminated water or snow from a spill or incident. Surface drainage water will be directed so that it will be possible to control it with sediment barriers, sorbent booms or easily blocked before reaching the drainage ditch.

FIGURE 1 : Location of the Environmental Waste Processing Facility.



Source: Google Maps, 2015

The SCP was implemented to ensure that the EWPF respects all applicable laws, regulations and requirements of the federal, territorial and municipal authorities. QE will obtain and comply with all required permits, approvals and authorizations required for the operations. The following applicable regulations and documents constitute an integral part of the spill contingency plan:

- Federal Legislation:
 - The Canadian Environmental Protection Act: controls hazardous substances from their production and/or import, their consumption, storage and/or disposal,
 - The Nunavut Waters and Nunavut Surface Rights Tribunal Act: provides for the conservation and utilization of waters in Nunavut, in a manner that will provide the optimum benefit for the residents of Nunavut,
 - The Northwest Territories Waters Regulations: requires that every licensee maintain accurate and detailed books and records, to be submitted to the Board each year, stating the quantity of water used under the licence as well as the quantity, concentration and type of any waste deposited,
 - The federal Transportation of Dangerous Goods Act and Regulations: ensure the protection of public health and safety, and the environment during the handling and transport of dangerous goods. The Regulations apply to all modes of transportation, by road, by sea, and by air;
- Territorial Legislation:
 - The Nunavut Environmental Protection Act: governs the protection of the environment from contaminants. The act defines offences and penalties as well as the powers of government inspectors;
- Guidelines and Policies:
 - The CCME¹:
 - Code of Practice for Used Oil Management: defines appropriate environmental options for the handling, storage, collection, recycling, transport, re-use and/or disposal of used oils in Canada. It helps regulatory authorities formulate provincial and/or regional strategies for used oil management,
 - CEQG: establishes the guideline values for contaminated soils,
 - CWQG for the Protection of Aquatic Life: establishes the guideline values for contaminated water,
 - The Guidelines for Preparation of Hazardous Material Spill Contingency Plans: describes parameters that should be considered in the development of hazardous materials spill emergency plans. It also defines the information that should be incorporated into a comprehensive contingency plan,
 - The Nunavut Spill Contingency Planning and Reporting Regulations: describe the requirements for spill reporting and emergency planning,
 - The Land Transportation Emergency Response Guideline for Petroleum Spills: developed by the Canadian Petroleum Products Institute outlines the scope, emergency response code of practice, response time guidelines, response equipment and personnel capability requirements.

1. Canadian Council of Ministers of the Environment

2. HAZARDOUS MATERIALS – TRANSPORT AND STORAGE

A variety of hazardous materials and waste will be managed at the EWPF. Storage quantities will be minimal after the last sealift of the season (i.e., October) and will increase throughout the winter season, to reach maximum capacity approximately 8 to 9 months later, before the first sealift of the season (i.e., July).

Furthermore, as part of the soil treatment process, sodium persulfate (a solid oxidizing agent) may be used and therefore stored onsite before usage. Because of its oxidizing properties, the sodium persulfate bags will be segregated from flammable and combustible waste products and therefore stored in a separate storage container.

In order to prevent any dangerous reactions between incompatible materials, all hazardous materials and waste will be stored in compliance with general chemical segregation rules.

Table 1 presents the approximate maximum quantities of hazardous products and waste materials that will be present at the transfer station before the first sealift of the season.

The material safety data sheets (MSDS) for the potential hazardous liquid products and waste to be stored onsite are presented in Appendix A.

TABLE 1: Estimated Maximum Material Storage Capacity

Shipping Name	Description	TDG Class	Maximum Storage Capacity	Type and Number of Containers
Waste lubricating oil	Used oil	NA	32,000 L	160 drums or 32 tote tanks or any combination of both
Waste glycol	Waste antifreeze	NA	19,200 L	96 drums or 19 tote tanks or any combination of both
Oily water (and snow)	Water and oil mixture	NA	10,000 L	10,000 L open tank
Batteries, wet, filled with acid	Vehicle batteries	8	6,800 kg	10 battery packs
Batteries, dry, containing potassium hydroxide, solid	Small batteries	8	800 kg	4 drums
Paint and paint related materials	Paints, thinner	3	16,000 kg	15 waste wranglers
Flammable liquids, not otherwise specified (gasoline)	Various petroleum products mixtures	3	32,000 L	160 drums
Oily contaminated solids (rags, absorbents, filters)	Oily solids	NA	7,200 kg	32 drums
Hydrocarbon contaminated soil	Oily soils	NA	3,000 m ³	Covered containment cells
Environmentally hazardous substances, solids, not otherwise specified (mercury)	Crushed fluorescent tubes and light bulbs	9	2,400 kg	11 drums
Propane	Propane tanks	2.1	800 kg	Bulk storage
Butane	Butane tanks	2.1	400 kg	4 waste wranglers
Acetylene	Gas cylinders	2.1	800 kg	Bulk storage
Oxygen	Gas cylinders	2.2 (5.1)	800 kg	Bulk storage
Helium	Gas cylinders	2.2	800 kg	Bulk storage
Argon	Gas cylinders	2.2	800 kg	Bulk storage
Aerosols	Aerosol cans, paint/solvents	2.1	2,000 kg	10 waste wranglers
Aerosols	Aerosol cans, oven cleaner	2.2 (8)	2,000 kg	10 waste wranglers
Organic solids, toxins, N.O.S. (medication)	Spent medication	6.1	200 kg	1 drum or 10 pails
Sodium persulfate	Soil treatment oxidizing agent (solid)	5.1	2,000 kg	25 kg bags stacked on pallets
Biomedical waste	Medical sharps	6.2	5,000 kg	7,500 UN-approved sharps containers (5 L each)

Notes: Pails are assumed to be high density polyethylene (HDPE), 20 L capacity
Drums are assumed to be steel, 205 L capacity
Tote tanks are assumed to be HDPE, 1,000 L capacity
Bulk bags are assumed to be 1 yd³ (approximately 750 L) capacity
Waste wranglers (Quatex™ bags) are assumed to be 1 yd³ (approximately 750 L) capacity
Battery packs are assumed to be 0.5 yd³ (approximately 380 L) capacity

The largest single storage container used for TDG¹ regulated liquid waste, such as Class 3 flammable liquids, is the 340 L open-top steel salvage drum.

The largest single storage container used for non-TDG regulated liquid waste, such as waste oil and antifreeze, is the 1,000 L HDPE tote tank with steel frame and pallet.

Solid waste, which is non-spillable, will be stored in either of:

- 20 L open-top HDPE pails, with lid and gasket;
- 205 L or 340 L open-top steel drums, with lid and gasket;
- 0.75 m³ waste wranglers made of woven polypropylene with reinforced sides and 6 mil inner liner;
- 0.75 m³ bulk bags made of woven polypropylene with a 6 mil inner liner;
- 3.75 m³ doubled bulk bags made of woven polypropylene with a 6 mil inner liner.

Emergency spill response equipment (i.e., spill kits) will be available at the EWPF. The spill kits will be regularly inspected and maintained. All spill kits will contain the appropriate type, size and quantity of equipment for the volume and type of product present at the storage location, as well as the environment likely to be affected by a spill (i.e., ground).

1. Transport of dangerous goods

3. DUTIES AND RESPONSIBILITIES

As part of the emergency spill response plan, QE is responsible for implementing, through its management team, the following procedures:

- Train Site personnel in spill response procedures and the proper use of response equipment and materials;
- In the event of a spill, mobilize all available Site personnel, equipment and tools, as required;
- Implement all required health and safety procedures at the spill location;
- Eliminate all fire hazards and potential ignition sources near the spill area;
- Control the source of the spill (i.e., reduce or stop product discharge);
- Contain the spilled product using the most appropriate methods and equipment (i.e., dykes, ditches, sorbent materials, containment booms, and other barriers);
- Evaluate the possibility of recovering the spilled materials;
- Obtain, if required, assistance from government agencies such as the Government of Nunavut Department of Environment (GN DoE) and/or Environment Canada;
- Comply with all applicable guidelines and regulations;
- Conduct a preliminary assessment of the environmental impacts;
- Within 24 hours of the event, report the spill to the Government of Nunavut Spill Report Line and submit a written spill report using the appropriate form (see below for the list of information required in the report).

Table 2 presents the management team responsible for overseeing emergency spill response operations and their contact information.

TABLE 2: QE Management Contact Information

Position	Contact
Olivier Simard EWPF Manager	Cell: 867 222-8194 (24 hrs)
Benoit Dion EWPF Director	Office Tel: 514-940-3332 Cell: 514-718-1230 (24 hrs)
On-Duty Environmental Technician Hazmat Specialist	Cell: 867 222-3246
Harry Flaherty Corporate Contact – President	Office Tel: 867 979-8406 Cell: 867 222-1713

As part of the spill response plan, the On-Duty Environmental Technician, acting as incident commander, is responsible for implementing the following procedures:

- Assume authority over the spill scene and the personnel involved;
- Activate the Spill Response Plan;
- Evaluate the initial situation and assess the magnitude of the spill;
- Develop an overall plan of action;
- Report to the EWPF Manager and provide recommendations regarding resource requirements (additional manpower, equipment, material, etc.) to complete the clean-up effort. The responsibility of the On-Duty Environmental Technician is to mobilize personnel and equipment to implement the clean-up.

The responsibilities of the EWPF Manager, with support from the EWPF Director, include the following:

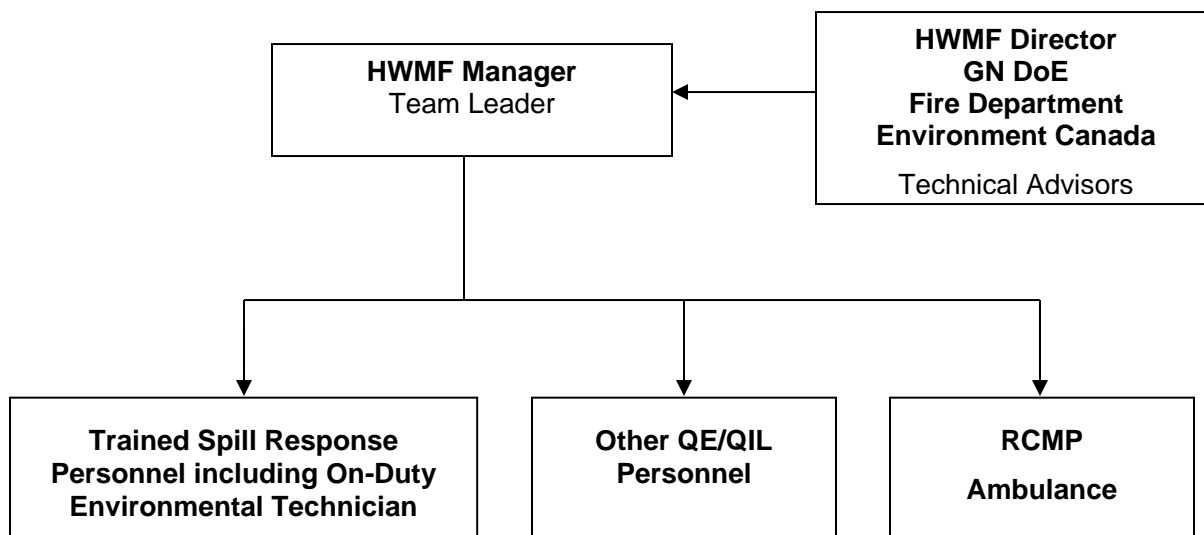
- Report the spill to NT-NU 24 hour Spill Report Line at 867 920-8130;
- Act as a liaison with Management to keep them informed of clean-up activities;
- Obtain additional required resources not available on-site for spill response and clean-up;
- Act as the spokesperson with government agencies as well as the public and the media, as appropriate;
- Document the cause of the spill and effectiveness of the clean-up effort, and implement the appropriate measures to prevent a recurrence of the spill;
- Prepare and submit follow-up documentation required by appropriate regulators.
- Ensure that the spill is cleaned up and all follow-up communications and reports are filed with the GN DoE and Environment Canada offices.

The responsibilities of the EWPF Director include the following:

- Work with the EWPF Manager on regulatory follow-up, as necessary;
- Act as the spokesperson with the government agencies, as well as the public and media, on any significant spill events.

Once a spill event is reported, the EWPF Manager will establish a specific strategy for containing and controlling the spill and to initiate the clean-up activities. The On-Duty Environmental Technician, as well as other external resources such as the Iqaluit Fire Department and GN DoE, may act as technical advisors prior to and during the intervention. The trained Spill Response Team will conduct all emergency spill response operations under the leadership of the EWPF Manager. During the clean-up phase of the intervention, other site personnel (e.g., heavy equipment operators, labourers, etc.) may be involved in the intervention. Figure 2 presents an organizational chart of the Spill Response Team.

FIGURE 2 : **Spill Response Team Organization Chart**



QE will ensure that all contracted marine shipping companies have their own spill contingency plan to respond to spill events during the course of their operations. When shipping hazardous materials to and from the EWPF, transport companies are required to carry out their operations in accordance with federal and international TDGRs¹ (i.e., TDGR-Clear language, IMDG², IATA³).

During transport, in the event of a of hazardous materials spill exceeding the quantities listed in Part 8.1 (1) of the TDGR, the shipping company will immediately report the incident to the RCMP and Nunavut Emergency Management at 1 800 693-1666 (as stated in Part 8.1 (5), TDGR). The immediate report must include as much of the information listed in Part 8.2 of the TDGR as is known at the time of the report. A follow-up report must be made, in writing, to the Director General within 30 days following the occurrence of the accidental release, the "dangerous goods accident" or the "dangerous goods incident". The follow-up report must include the information listed in Part 8.3 of the TDGR.

If a spill occurs during transport on water or during the transfer of hazardous materials from ship to land, the shipping company will be responsible for implementing the appropriate spill response measures in accordance with their spill contingency plan.

1. Transport of dangerous goods regulations
2. International Maritime Dangerous Goods
3. International Air Transport Association

4. TRAINING AND DRILLS

Site personnel shall be informed that any spill of hazardous liquids or solids, whatever the extent, must be immediately reported to the EWPF Manager.

The EWPF Manager will select a certain number of workers to form the Spill Response Team. Crew members will be trained in emergency spill response procedures and operations. Training will include knowledge of the:

- Properties of the hazardous materials stored onsite;
- Common causes of spills;
- Environmental effects of spills;
- Worker health and safety during emergency interventions;
- PPE¹ and clothing;
- Spill response procedures and techniques on land and snow, and during all 4 seasons;
- Spill response equipment and materials.

Training will also include the analysis of potential spill events that are more likely to occur during waste management operations. Spills are more likely to be caused by:

- Human error during the handling of hazardous product and waste containers; or
- Rupture of containers from accidental damage, deterioration or equipment failure.

Training will include classroom training and spill response drills.

1. Personal protective equipment

5. MATERIALS AND EQUIPMENT

In order to prevent spills and to provide adequate response in the event of a spill, QE will maintain on-site the appropriate types and quantities of response equipment and materials.

To facilitate immediate first response in the event of a fluid release on land, 2 spill kits will be strategically placed in the areas of waste container handling. The contents of the spill kits are listed in Table 3.

TABLE 3:Spill Kit Contents

Spill Kit	Contents	Quantity
Q Ultra 75 Hydrophobic 140 gallon capacity	75 gallon yellow metal overpack drum	1
	12 oz 15" x19" Sorbent pads	100
	3" x 4 ft Sorbent socks	15
	5" x 10 ft Sorbent booms	4
	25 lb granular sorbent	1
	Shovel	1
	30" x 60" x 6 mil disposal bags	5
	Epoxy sticks	2
	Coverall and boot covers	2
	Pair of safety goggles	2
	Pair of gloves	2

In addition to the spill response material listed above, a backhoe excavator and a dump truck are available to aid in spill response and recovery efforts.

6. SPILL RESPONSE PROCEDURES

A spill is defined as the discharge of a hazardous product out of its containment and into the environment. Potentially hazardous to humans, vegetation, and wildlife they vary in severity, depending on several factors including: the nature of the material, the spill quantity, the location and season. Waste petroleum products (waste oil, waste fuels, oil-based paints) are the main group of waste material that may be spilled and therefore spill response procedures will focus on this type of hazardous material.

All Site personnel will be briefed on the procedures to be followed to report a spill and initiate spill response. The first person to notice a spill will take the following steps:

1. Immediately warn other personnel working near the spill area;
2. Evacuate the area if the health and safety of personnel is threatened;
3. Notify the EWPF Manager, who will initiate the spill response operations;
4. In the absence of danger, and before the spill response team arrives on the scene, take any safe and reasonable measures to stop, contain and identify the nature of the spill.

All spill response interventions carried out by the spill response team will follow these general procedures:

- **Source Control:** Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as sealing a puncture hole with whatever is at hand (e.g., a rag, a piece of wood, tape, etc.), re-positioning a leaking container such that the puncture hole is facing up, or transferring fluid from leaking containers;
- **Control of Free Product:** Prevent or limit the spread of the spilled material. Accumulate/concentrate the spilled product in an area to facilitate recovery. Barriers positioned down-gradient of the spill will slow or stop the progression of the spill. Barriers can consist of absorbent booms, dykes, berms, or trenches dug into the ground;
- **Protection:** Evaluate the potential dangers of the spill so as to protect sensitive ecosystems and natural resources. Block or divert the spilled material away from sensitive receptors. This can also be achieved by using varying types of barriers;
- **Clean Up the Spill:** Recover and containerize as much free product as possible. Recover and containerize/treat contaminated soils, water, and snow;
- **Report the Spill:** Provide basic information such as the date and time of the spill, the type and amount of product discharged, the location and approximate size of the spill, the actions already taken to stop and contain the spill, the meteorological conditions and any perceived threat to human health or the environment. Reporting requirements are presented in Section 8 of the present document.

Specific response procedures for spills on land and snow are presented in the following sections. Because the containers used to store liquids are of relatively small volume (205 L and 1,000 L), and because of the mitigation measures to be implemented to control surface drainage, any spill of liquids will likely not reach any drainage ditches. As such, response to spills on water is not discussed in this Plan.

Procedures will vary depending on the season.

The spill response flowchart is presented in Appendix B.

6.1 Spills on Land

Response to spills on land will include the previously detailed general procedures. The main spill control techniques involve the use of 2 types of barriers: dykes and trenches. Barriers should be placed on the downgrade (down slope) from the source of the spill, and as close as possible to the source of the spill. Barriers will slow the progression of the petroleum product and will also serve as containment to allow recovery of the fluids.

Depending on the volume spilled, the site of the spill, as well as available materials, a dyke may be built with soil, booms, lumber, snow, etc. A plastic liner should be placed at the foot of and over the dykes to protect the underlying soils, or other materials, and to facilitate recovery of the fuel. Construct dykes in such a way as to accumulate a thick layer of free product in a single area (V-shaped or U shaped).

Trenches are useful in the presence of permeable soils and when the spilled fluid is migrating below the ground surface. A plastic liner should be placed on the downgrade edge of the trench to protect the underlying soils. Liners should not be placed at the bottom of the trench so as to allow water to continue flowing underneath the layer of floating oil.

The use of large quantities of absorbent materials to recover important volumes of oil should be avoided. Large volumes of free product shall be recovered, as much as possible, by using vacuums and pumps, then containerized. Mixtures of water and oil may be processed through an oil-water separator. Absorbent sheets should be used to soak up residual oil on water, on the ground (soil and rock), and on vegetation. Peat moss may also be sprinkled on vegetation to absorb films of petroleum products.

6.3 Spills on Snow

In general, snow and ice will slow the movement of hydrocarbons. The presence of snow may also hide the oil slick and make it more difficult to follow its progression. Snow is generally a good natural sorbent, as hydrocarbons will have a tendency to be soaked up by snow through capillary action. However, the use of snow as a sorbent material shall be limited as much as possible. Snow and frozen ground will also prevent hydrocarbons from migrating down into soils, or at minimum slow the migration process.

Response to spills on snow and ice will include the previously detailed general procedures. Most response procedures for spills on land may be used for spills on snow and ice. The use of dykes (i.e., compacted snow berms lined with plastic sheeting) will slow the progression of the oil and will also serve as containment to allow recovery of the oil.

Free product shall be recovered by using a vacuum, a pump, or sorbent materials. Contaminated snow and ice will be scraped up manually or using heavy equipment, depending on volumes. The contaminated snow and ice will be placed in containers. Once melted, the oily water will be processed through the Water Treatment Facility.

6.4 Disposal of Spilled Materials

Steel drums and wrangler bags will be used to contain used sorbent materials and transport south by sealift to an authorized disposal facility.

7. POTENTIAL SPILL ANALYSIS

In order to prepare for emergency spill response, a potential spill analysis was conducted on various “worst case” scenarios. The exercise serves to identify potential risk areas, as well as determine the fate of spilled products and their environmental effects. Two potential spill scenarios were identified for the EWPF:

- Tote Tank spill; and
- Vandalism Spill.

These 2 spill scenarios are analyzed in detail in the following pages.

Scenario #1: Tote Tank Spill

Description of Incident: The contents of a tote tank containing waste oil spilled to the ground during loading of the tote tank from the storage container to a flatbed trailer. Oil spilled by gravity. Spill occurs in the storage yard.

Potential causes: Tote tank drops from a height of 5 ft (1.5 m), human error, accident.

Hazardous products spilled: Waste oil.

Maximum volume spilled: 1,000 L.

Estimated time to spill entire volume: 5 minutes.

Immediate receiving medium: Soil.

Most probable direction of oil slick migration: As the ground has a slight slope towards the east, the spill should slowly flow towards the east.

Distance and direction to nearest receiving body of water: Drainage ditch (along property limits) located 65 m to the east.

Estimated emergency spill response time: 5 minutes after spill is noticed.

Spill response procedures: Generally, contain and recover oil spill on the ground using dykes or booms as described in Section 6.1. Prevent the oil from reaching the drainage ditches. Collect free product for temporary storage. Excavate contaminated soils and/or snow, store and manage appropriately.

More specifically, a spill of oil, flowing towards the east will be intercepted by the access road (to the east of the site) which is at higher grade than the natural ground surface. A dyke or boom placed perpendicular to the road will act as a low point to collect the free product before it reaches the drainage ditch.

Scenario #2: Vandalism Spill

Description of incident: Spill to the ground of part of the contents of 4 tote tanks containing waste oil caused by loader forks puncturing tote tanks. Oil spilled by gravity. Spill occurs in the storage yard.

Potential causes: Vandalism by a disgruntled worker.

Hazardous products spilled: Waste oil.

Maximum volume spilled: 2,000 L.

Estimated time to spill entire volume: 10 minutes.

Immediate receiving medium: Soil.

Most probable direction of slick migration: As the ground has a slight slope towards the east, the spill should slowly flow towards the east in a plume shape.

Distance and direction to nearest receiving body of water: Drainage ditch (along property limits) located 65 m to the east.

Estimated emergency spill response time: 5 minutes after spill is noticed.

Spill response procedures: Plug 8 puncture holes with rags, absorbent sheets, duct tape, etc. Contain oil spill on the ground and recover using dykes or booms as described in Section 6.1. Prevent the oil from reaching the drainage ditches. Collect free product for temporary storage. Excavate contaminated soils and/or snow, store and manage appropriately.

More specifically, a spill of oil, flowing towards the east will be intercepted by the access road (to the east of the site) which is at higher grade than the natural ground surface. A dyke or boom placed perpendicular to the road will act as a low point to collect the free product before it reaches the drainage ditch.

8. REPORTING REQUIREMENTS

Quantities of spilled hazardous substances requiring reporting are listed in Schedule B of the *Nunavut Spill Contingency and Reporting Regulation*. For example, for all flammable liquids (Class 3), spills of volumes equal to or greater than 100 L (half a drum) require reporting.

After the initial field emergency response to the spill event, the spill will be reported to the 24-hour Spill Report Line:

24-Hour Spill Report Line
Tel. 867 920-8130
or
Fax: 867 920-8127

Failure to report a spill can lead to fines. It is the responsibility of the EWPF Manager to prepare the proper reports and transmit them to the regulatory authorities. Table 4 presents an additional contact list for spill reporting.

TABLE 4: Contact List for Spill Reporting

Department	Contact Person	E-mail	Telephone
GN-DOE	Alex Brisco	mbrisco@gov.nu.ca	867 975-7726
Fire Department (General)	-	-	867 979-5655
Fire Department (Emergency)	-	-	867 979-4422
RCMP - Iqaluit	-	-	867 979-0123
Ambulance	-	-	867 979-4422

Afterwards, the spill event will be reported in writing using the standard Spill Report Form presented in Appendix C.

The written report will include the following information:

- Date and time of the incident;
- Location or map coordinates and direction of spill movement, if not at steady state;
- Party responsible for the spill;
- Type and estimated quantities of spilled contaminant(s);
- Specific cause of the incident;
- Status of the spill, indicating if spilled materials are still moving or now at steady state;
- Approximate surface area of the contaminated zone;

- Factors affecting spill or recovery, such as temperature, wind, etc.;
- Status on containment actions, indicating whether:
 - naturally,
 - booms, dykes or other,
 - no containment has been implemented;
- Corrective action taken, or proposed, to clean, contain or dispose of the spilled material;
- Whether assistance is required, and in what form;
- Whether the spill poses a hazard to persons or property (i.e., fire, drinking water);
- Comments and recommendations;
- The name, position and employer of the person reporting the spill; and,
- The name, position and department of the person to whom the spill is reported.

In the event of a spill involving the marine carrier delivering waste, QE will ensure that the subcontractor reports any spill event under its responsibility.

APPENDIX A

MSDS OF LIQUID HAZARDOUS WASTE STORED ON-SITE

- Acetone
- Acetylene
- Aerosols (oven cleaner)
- Aerosols (paints)
- Argon
- Batteries, dry (potassium hydroxide)
- Batteries, wet (acid-lead)
- Butane
- Diesel
- Engine oil
- Ethylene Glycol
- Gasoline
- Helium
- Hexane
- Industrial Hydraulic Oil
- Jet A-1
- Mercury
- Nitric acid (10%)
- Oxygen
- Paints, latex
- Paints, oil-based
- Propane
- Propylene
- Sodium persulfate
- Varsol™
- Voltesso™








EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)

(CAN) CANUTEC : 1(613) 996-6666 (24hrs)

(USA) Anachemia : 1(518) 297-4444

(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: B-2 D-2B		TDG CLASS: 3 PIN: UN1090 PG: II
 	   	

Section I. Product Identification and Uses

Product name	ACETONE	CI#	Not available.
Chemical formula	CH ₃ COCH ₃	CAS#	67-64-1
Synonyms	2-Propanone, Dimethyl ketone, Methyl ketone, Ketone propane, Dimethyl formaldehyde, AC-0150, AC-0150SC, AC-0150PG, CD-0150, GD-0150, AC-0151, AC-0152, M-11823, M-12097, M-13002, M-13387, 00870, 00876, 00878, 00884, 00896	Code	AC-0150
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	Formula weight	58.08
		Supersedes	
Material uses	For laboratory use only.		

Section II. Ingredients

Name	CAS #	%	TLV
1) ACETONE	67-64-1	90-100	Exposure limits: ACGIH TWA 500 ppm (1188 mg/m ³); STEL 750 ppm (1780 mg/m ³)

Toxicity values of the hazardous ingredients
ACETONE:

 ORAL (LD₅₀): Acute: 3000 mg/kg (Mouse). 5800 mg/kg (Rat). 5340 mg/kg (Rabbit).

 VAPOR (LC₅₀): Acute: 50100 mg/m³ (Rat) (8 hour(s)). 44000 mg/m³ (Mouse) (4 hour(s)).

Section III. Physical Data

ACETONE

page 2/4

Physical state and appearance / Odor	Clear, colorless volatile liquid with a characteristic sweetish odor.
pH (1% soln/water)	Not available.
Odor threshold	2-62 ppm
Percent volatile	100% (V/V)
Freezing point	-94°C
Boiling point	57°C
Specific gravity	0.79 (Water = 1)
Vapor density	2 (Air = 1)
Vapor pressure	>181 (400) mm of Hg @ 20°C (39.5°C)
Water/oil dist. coeff.	0.58
Evaporation rate	7.7 (n-Butyl acetate = 1).
Solubility	Miscible in water.

Section IV. Fire and Explosion Data

Flash point	CLOSED CUP: -20°C (Tag Closed Cup)
Flammable limits	LOWER: 2% UPPER: 13%
Auto-ignition temperature	464°C
Fire degradation products	Oxides of carbon (CO, CO ₂).
Fire extinguishing procedures	Use DRY chemical, carbon dioxide, or alcohol-resistant foam. Water may be ineffective to extinguish fires. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode. Do not enter confined fire space without adequate protective clothing and approved positive pressure self-contained breathing apparatus. Cool containing vessels with flooding quantities of water. Disperse vapors with water spray if they have not ignited.
Fire and Explosion Hazards	Extremely flammable. Vapors formed from this product may travel or be moved by air currents and ignited by pilot lights, other flames, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from handling point. Vapor forms explosive mixture with air. Container explosion may occur under fire conditions or when heated. Contact with oxidizers may cause fire and/or explosion. The product is not sensitive to impact. The product is sensitive to static discharge. Emits toxic fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Ingestion and inhalation. Eye contact. Skin contact. Skin absorption.
Effects of Acute Exposure	Harmful by ingestion, inhalation or skin absorption. Irritant. Target organs: respiratory system, skin, eyes, lungs, central nervous system, liver, kidneys. 2500 ppm (ACETONE) is immediately dangerous to life or health.
Eye	Causes irritation, conjunctivitis, and possible damage to the cornea. May cause permanent damage. IRRITATION: EYE-RABBIT 20 mg SEVERE.
Skin	Causes skin irritation. Prolonged and repeated contact with skin can cause defatting and drying of the skin resulting in dermatitis. Readily absorbed through skin. See inhalation.
Inhalation	Can cause headache, nausea, vomiting, weakness, dizziness, drowsiness, blurred vision, incoordination, narcosis and central nervous system depression.
Ingestion	Causes gastrointestinal irritation. Kidney damage. See inhalation.

Section V. Toxicological Properties

ACETONE

page 3/4

Effects of Chronic Overexposure

Defatting dermatitis with prolonged use. Human: passes the placental barrier, detected in maternal milk. Carcinogenic effects: Not available. Mutagenic effects: Not available. Teratogenic effects: Not available. Toxicity of the product to the reproductive system: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated. Medical conditions which may be aggravated: Individuals with preexisting diseases of the skin or eyes may be more susceptible to the toxicity of overexposure to this product.

Section VI. First Aid Measures

Eye contact

Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek medical attention.

Skin contact

Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Seek medical attention. Wash contaminated clothing before reusing.

Inhalation

Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek medical attention.

Ingestion

Do not induce vomiting. Guard against aspiration into lungs by having the individual turn on their left side. Never give anything by mouth to an unconscious or convulsing person. Get immediate medical attention. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus.
NOTES TO PHYSICIAN: If more than 2.0 ml/kg has been ingested, vomiting should be induced with supervision. If symptoms such as loss of gag, reflex, convulsions or unconsciousness occur before vomiting, gastric lavage with a cuffed endotracheal tube should be considered.

Section VII. Reactivity Data

Stability

Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination.

Hazardous decomp. products

Not available.

Incompatibility

May react violently or explosively with: oxidizing agents, acids, bases, chlorinated solvents/ alkali mixtures, reducing agents, chromic anhydride, hexachloromelamine, trichloromelamine, sulfur dichloride, potassium tert-butoxide, 2-methyl-1,3-butadiene, ammonia, amines, halogen compounds, perchlorates, nitrosyl chloride, bromoform, chloroform, permonosulfuric acid, chromyl chloride, sodium hypobromite, hydrogen peroxide, acetic acid, sulfuric acid, nitric acid, hydrochloric acid.

Reaction Products

Not available. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

ACETONE

page 4/4

Protective Clothing in case of spill and leak Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.

Spill and leak Evacuate the area. Eliminate all sources of ignition. Stay upwind. Keep out of low areas. Dyke the area with sand or a natural barrier. Absorb on sand or vermiculite and place in a closed container for disposal. Use water spray to reduce vapors. Use non-sparking tools. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material. Runoff to sewer may create fire or explosion hazard.

Waste disposal Burn in a chemical incinerator equipped with an after burner and scrubber. According to all applicable regulations. May be harmful to aquatic life. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Storage and Handling Aluminum containers are not recommended for storage. Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Take precautionary measures against electrostatic discharges. Ground the container while dispensing. Ground all equipment containing material. Use explosion proof equipment. Use non-sparking tools. Watch for accumulation in low confined areas. Empty containers may contain a hazardous residue. Do not use pressure to dispense. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Section IX. Protective Measures

Protective clothing Face shield and/or splash goggles. Impervious butyl rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

Engineering controls Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Use adequate ventilation. Do not use in unventilated spaces. Vapors are heavier than air and may travel along the ground or pool in low areas. Because vapor is heavy, ventilation must be provided at floor level as well as at higher levels.

Section X. Other Information

Special Precautions or comments Extremely flammable liquid! Irritant! Risk of serious damage to eyes. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Keep away from heat, sparks and flame. Liquid can accumulate static charge by flow or agitation. Take precautionary measures against static discharges. Bond and ground transfer containers and equipment to avoid static accumulation. Use non-sparking tools. Handle and open container with care. Container should be opened only by a technically qualified person.
Synergistic materials: Exposure to acetone may enhance the liver toxicity of chlorinated solvents (carbon tetrachloride, chloroform, trichloroethylene, 1,1,2-trichloroethane, 1,1-dichloroethylene, dibromochloromethane, bromodichloromethane), bromoform, ethanol and acetonitrile.
RTECS NO. AL3150000 (Acetone).



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 11-Jul-2012



While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

1 Identification of substance

- **Product details**

- **Trade name:** Acetylene

- **Article number:** 030-01-0003

- **Creation date:** 08/09/2006

- **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

: (905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER

CHEMTREC (800) 424-9300 OR

Linde National Operations Center (800) 232-4726

Pse ensure that this MSDS is received by the appropriate person.

- **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

- **Chemical characterization:**

- **CAS No. Description**

74-86-2 Acetylene

- **Identification number(s)**

- **EINECS Number:** 200-816-9

- **Index number:** 601-015-00-0

3 Hazards identification

- **Hazard description:**



Highly flammable

- **WHMIS-symbols:**

A - Compressed gas

B1 - Flammable gas

F - Dangerously reactive material



- **HMIS-ratings (scale 0 - 4)**

HEALTH 2

Health = 2

FIRE 4

Fire = 4

REACTIVITY 2

Reactivity = 2

- **NFPA ratings (scale 0 - 4)**



Health = 0

Fire = 4

Reactivity = 3

(Contd. on page 2)

CDN

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

(Contd. of page 1)

Information pertaining to particular dangers for man and environment:

Heating may cause an explosion.

Highly flammable.

Classification system:

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

GHS label elements

Danger

2.2/1 - Extremely flammable gas.


Warning

2.5/D - Contains gas under pressure; may explode if heated.

Prevention:

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Response:

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Eliminate all ignition sources if safe to do so.

Storage:

Protect from sunlight. Store in a well-ventilated place.

Store in a well-ventilated place.

4 First aid measures

After inhalation:

Supply fresh air. If required, provide artificial respiration and consult doctor. Keep patient warm.

After skin contact:

Contaminated clothing presents a fire hazard and should be removed immediately. Wash off immediately with soap and plenty of water. Get medical attention if irritation persists.

After eye contact: Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.

After swallowing: Not applicable.

5 Fire fighting measures

Suitable extinguishing agents:

Use fire fighting measures that suit the environment.

In the case of fires caused by ignited acetylene leaks:

- DO NOT extinguish unless it is possible (without risk) to shut-off gas flow; explosive vapours could form and re-ignition may occur.

Evacuate area as soon as possible.

Protective equipment: Wear self-contained respiratory protective device.

6 Accidental release measures

Person-related safety precautions:

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation.

Stop leak - ONLY if possible to do so without risk.

Measures for environmental protection: Prevent seepage into sewage system, workpits and/or cellars.

Measures for cleaning/collecting: Ensure adequate ventilation.

CDN

(Contd. on page 3)

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

(Contd. of page 2)

7 Handling and storage

· Handling:

An acetylene cylinder valve should not be opened more than approximately 1&1/2 turns.

DO NOT use acetylene at pressures above 15 psig.

DO NOT withdraw/flow at a rate exceeding 1/10 (one tenth) of the cylinder capacity per hour during intermittent use and 1/15 (one-fifteenth) per hour during continuous use.

· Information for safe handling:

Keep away from heat and direct sunlight.

Handle with care. Avoid jolting, friction, and impact.

Use only in well ventilated areas.

Do not mix with air or oxygen above atmospheric pressure.

Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.

· Information about protection against explosions and fires:

Keep ignition sources away - Do not smoke.

Protect from heat.

Protect against electrostatic charges.

Prevent impact and friction.

Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.

· Storage:

· Requirements to be met by storerooms and receptacles:

Store in a cool location.

Do not expose cylinder to temperatures higher than 50°C (122 °F)

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C).

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

· Information about storage in one common storage facility:

Store separately from cylinders containing oxygen or oxidants by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.

Sources of ignition should be removed from storage area.

· Further information about storage conditions:

Keep cylinder valve tightly closed.

Store in cool, dry conditions in well sealed receptacles.

Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

· Additional information about design of technical systems:

Adequate local ventilation.

Safety showers and eyewash stations should be nearby.

· Components with limit values that require monitoring at the workplace:

74-86-2 Acetylene (60 - 100%)

EL Simple asphyxiant

· Additional information: The lists that were valid during the creation were used as basis.

· Personal protective equipment:

· General protective and hygienic measures:

Wash hands before breaks and at the end of work.

Protective clothing and PPE should be kept free of oil and grease, generally in clean condition

PPE should be inspected and maintained regularly to retain effectiveness.

(Contd. on page 4)

CDN

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

(Contd. of page 3)

· **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

· **Protection of hands:**

Protective gloves.

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Eye protection:** Safety glasses* **9 Physical and chemical properties**· **General Information**

Form:	Gaseous.
Color:	Colorless
Odor:	Ether-like

· **Change in condition**

Melting point/Melting range: -80.8°C

Boiling point/Boiling range: -83°C

· **Flash point:**

< 0°C
Not applicable.

· **Flammability (solid, gaseous):** Highly flammable.· **Ignition temperature:** 325°C· **Danger of explosion:**

Heating may cause an explosion.
In use, may form flammable/explosive vapour-air mixture.

· **Explosion limits:**

Lower:	2.3 Vol %
Upper:	78> Vol %

· **Solubility in / Miscibility with**

Water at 20°C: 1.185 g/l

* **10 Stability and reactivity**

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

· **Materials to be avoided:**

· **Dangerous reactions**

May form explosive gas mixture with air.

May react with oxidizing agents.

· **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:** LC50 - None available

· **Primary irritant effect:**

· **on the skin:** No irritating effect.

· **on the eye:** No irritating effect.

(Contd. on page 5)

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

(Contd. of page 4)

- **Sensitization:** No sensitizing effects known.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:** Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

- **TDG and DOT regulations:**



- **Hazard class:** 2
- **Identification number:** UN1001
- **Packing group:** -
- **Proper shipping name (technical name):** ACETYLENE, DISSOLVED
- **Label:** 2.1
- **Packaging group:** -

- **Maritime transport IMDG:**



- **IMDG Class:** 2.1
- **UN Number:** 1001
- **Label:** 2.1
- **Packaging group:** -
- **EMS Number:** F-D,S-U
- **Marine pollutant:** No
- **Proper shipping name:** ACETYLENE, DISSOLVED

- **Air transport ICAO-TI and IATA-DGR:**



- **ICAO/IATA Class:** 2
- **UN/ID Number:** 1001
- **Label:** 2.1
- **Packaging group:** -
- **Proper shipping name:** ACETYLENE, DISSOLVED

(Contd. on page 6)

CDN

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

· UN "Model Regulation": UN1001, ACETYLENE, DISSOLVED, 2.1

(Contd. of page 5)

* 15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Cancerogenity categories

· EPA (Environmental Protection Agency)

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

· Canadian substance listings:

· Canadian Domestic Substances List (DSL)

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

· Canadian Ingredient Disclosure list (limit 1%)

Substance is not listed.

· Product related hazard informations:

The product was 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.

· Hazard symbols:

Highly flammable

· Risk phrases:

Heating may cause an explosion.

Highly flammable.

· Safety phrases:

After contact with skin, was immediately with plenty of water

(Contd. on page 7)

Material Safety Data Sheet

Printing date 03/11/2015

Version 7

Reviewed on 03/11/2015

Trade name: Acetylene

(Contd. of page 6)

Keep container in a well-ventilated place.
 Keep away from sources of ignition - No smoking.
 Take precautionary measures against static discharges.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists
 CAS: Chemical Abstract Service (Division of the American Chemical Society)
 DOT: US Department of Transportation
 EINECS: European Inventory of Existing Commercial Chemical Substances
 GHS: Globally Harmonized System of Classification and Labelling of Chemicals
 HMIS: Hazardous Material Identification System
 IATA: International Air Transportation Association
 IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"
 ICAO: International Civil Aviation Association
 ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"
 IMDG: International Marine Code for Dangerous Goods
 WHIMS: Workplace Hazardous Material Information System
 LC50: Lethal Concentration, 50 Percent
 LD50: Lethal Dose, 50 Percent
 EL: Exposure Limit per ACGIH TLV
 EV: Permissible Exposure Limit per OSHA
 N/A: Not Applicable

CDN

SAFETY DATA SHEET

Easy-Off Heavy Duty Oven Cleaner Aerosol



HEALTH • HYGIENE • HOME

1. Product and company identification

Product name : Easy-Off Heavy Duty Oven Cleaner Aerosol

Distributed by : Reckitt Benckiser LLC.
Morris Corporate Center IV
399 Interpace Parkway (P.O. Box 225)
Parsippany, New Jersey 07054-0225
+1 973 404 2600

Emergency telephone number (Medical) : 1-800-338-6167

Emergency telephone number (Transport) : 1-800-424-9300 (U.S. & Canada) CHEMTREC
Outside U.S. and Canada (North America), call Chemtrec:703-527-3887

Website: <http://www.rbnainfo.com>

Product use : Oven Cleaner

This SDS is designed for workplace employees, emergency personnel and for other conditions and situations where there is greater potential for large-scale or prolonged exposure, in accordance with the requirements of USDOL Occupational Safety and Health Administration.

This SDS is not applicable for consumer use of our products. For consumer use, all precautionary and first aid language is provided on the product label in accordance with the applicable government regulations, and shown in Section 15 of this SDS.

SDS # : 371752PSDS v3.0

Formulation #: 772-004 (371752 v5.0)

UPC Code / Sizes : 62338 00138 (16oz. Aerosol Can) 62338 87979 (14.5oz . Aerosol Can)

2. Hazards identification

Classification of the substance or mixture : FLAMMABLE AEROSOLS - Category 2
CORROSIVE TO METALS - Category 1
SKIN CORROSION/IRRITATION - Category 1
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Flammable aerosol.
May be corrosive to metals.
Causes severe skin burns and eye damage.

Precautionary statements

Code # : FF371752_5 **SDS # :** 371752PSDS v3.0 **Date of issue :** 13/10/2014.
(371752PSDS v3.0)

371752PSDS v3.0

2. Hazards identification

General	: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
Prevention	: Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Keep only in original container. Pressurized container: Do not pierce or burn, even after use. Do not spray on an open flame or other ignition source. Do not breathe dust or mist. Wash hands thoroughly after handling.
Response	: Absorb spillage to prevent material damage. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage	: Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F. Store in corrosive resistant container with a resistant inner liner.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Supplemental label elements	: None known.
Hazards not otherwise classified	: None known.

3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	%	CAS number
sodium hydroxide	2.5 - 5	1310-73-2
2-(2-butoxyethoxy)ethanol	2.5 - 5	112-34-5
2-aminoethanol	2.5 - 5	141-43-5

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance

4. First aid measures

- for 48 hours.
- Skin contact** : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
- Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Move to fresh air. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes serious eye damage.
- Inhalation** : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Causes severe burns.
- Ingestion** : May cause burns to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur
- Ingestion** : Adverse symptoms may include the following:
stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Flammable aerosol. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Gas may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back, causing fire or explosion. Bursting aerosol containers may be propelled from a fire at high speed. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. In the case of aerosols being ruptured, care should be taken due to the rapid escape of the pressurized contents and propellant. If a large number of containers are ruptured, treat as a bulk material spillage according to the instructions in the clean-up section. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Absorb spillage to prevent material damage. Dispose of via a licensed waste disposal contractor.

371752PSDS v3.0

6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Absorb spillage to prevent material damage. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Absorb spillage to prevent material damage.

- Conditions for safe storage, including any incompatibilities** : Do not store above the following temperature: 50°C (122°F). Store in accordance with local regulations. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store in corrosive resistant container with a resistant inner liner. Store locked up. Eliminate all ignition sources. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Control

Occupational exposure limits

Ingredient name	Exposure limits
sodium hydroxide	ACGIH TLV (United States, 6/2013). C: 2 mg/m ³ OSHA PEL 1989 (United States, 3/1989). CEIL: 2 mg/m ³ NIOSH REL (United States, 10/2013). CEIL: 2 mg/m ³ OSHA PEL (United States, 2/2013). TWA: 2 mg/m ³ 8 hours.
2-(2-butoxyethoxy)ethanol	ACGIH TLV (United States, 6/2013). TWA: 10 ppm 8 hours. Form: Inhalable fraction and vapor
2-aminoethanol	ACGIH TLV (United States, 6/2013). TWA: 3 ppm 8 hours. TWA: 7.5 mg/m ³ 8 hours. STEL: 6 ppm 15 minutes. STEL: 15 mg/m ³ 15 minutes. OSHA PEL 1989 (United States, 3/1989). TWA: 3 ppm 8 hours. TWA: 8 mg/m ³ 8 hours. STEL: 6 ppm 15 minutes.

8. Exposure controls/personal protection

STEL: 15 mg/m³ 15 minutes.
NIOSH REL (United States, 10/2013).
 TWA: 3 ppm 10 hours.
 TWA: 8 mg/m³ 10 hours.
 STEL: 6 ppm 15 minutes.
 STEL: 15 mg/m³ 15 minutes.
OSHA PEL (United States, 2/2013).
 TWA: 3 ppm 8 hours.
 TWA: 6 mg/m³ 8 hours.

Appropriate engineering controls

- : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection

- : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection

- : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

- : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

371752PSDS v3.0

9. Physical and chemical properties

Appearance

Physical state : Liquid. [Liquefied compressed gas.]

Color : White.

Odor : Floral.

Odor threshold : Not available.

pH : 13.3 [Conc. (% w/w): 100%]

Melting point : Not available.

Boiling point : Not available.

Flash point : Not available.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Relative density : 0.963 to 1.177

Solubility : Easily soluble in the following materials: cold water and hot water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Aerosol product

Type of aerosol : Foam

Heat of combustion : 3.816 kJ/g

10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur. Polymerization. : There are no data available on the mixture itself.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame).

Incompatible materials : Reactive or incompatible with the following materials: metals Do not mix with household chemicals

Hazardous decomposition products : Hazardous decomposition products : carbon oxides , Various Organic chemicals.

371752PSDS v3.0

11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-(2-butoxyethoxy)ethanol	LD50 Dermal	Rabbit	2700 mg/kg	-
	LD50 Oral	Rat	4500 mg/kg	-
2-aminoethanol	LD50 Oral	Rat	1720 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
sodium hydroxide	Eyes - Severe irritant	Monkey	-	24 hours 1 Percent	-
	Eyes - Mild irritant	Rabbit	-	400 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	1 Percent	-
	Eyes - Severe irritant	Rabbit	-	0.5 minutes 1 milligrams	-
	Skin - Mild irritant	Human	-	24 hours 2 Percent	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 milligrams	-
2-(2-butoxyethoxy)ethanol	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
2-aminoethanol	Eyes - Severe irritant	Rabbit	-	20 milligrams	-
	Eyes - Severe irritant	Rabbit	-	250 Micrograms	-
	Skin - Moderate irritant	Rabbit	-	505 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

371752PSDS v3.0

11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Causes severe burns.

Ingestion : May cause burns to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

371752PSDS v3.0

11. Toxicological information

Route	ATE value
Oral	39686.2 mg/kg
Dermal	56842.1 mg/kg

12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
2-(2-butoxyethoxy)ethanol 2-aminoethanol	Acute LC50 1300000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
	Acute EC50 8.42 mg/l Fresh water	Algae - Desmodesmus subspicatus	72 hours
	Acute LC50 >100000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 170000 µg/l Fresh water	Fish - Carassius auratus	96 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
2-(2-butoxyethoxy)ethanol 2-aminoethanol	1	-	low
	-1.31	-	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.
Release of large quantities into water may cause a pH-change resulting in danger for aquatic life.







13. Disposal considerations

Disposal methods : Waste packaging should be recycled. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

371752PSDS v3.0

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
TDG Classification	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
Mexico Classification	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
IMDG Class	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
IATA-DGR Class	UN1950	AEROSOLS, flammable, containing substances in Class 8 packing group II	2.1 (8)	-	 	<u>See DG List.</u>

PG* : Packing group

15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) PAIR:** 2-(4-tert-butylbenzyl)propionaldehyde; 3-p-cumenyl-2-methylpropionaldehyde
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): Not determined.
Clean Water Act (CWA) 311: sodium hydroxide
Clean Air Act (CAA) 112 regulated flammable substances: butane

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

371752PSDS v3.0

15. Regulatory information

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Reactive
Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
sodium hydroxide	2.5 - 5	No.	No.	No.	Yes.	No.
2-(2-butoxyethoxy)ethanol	2.5 - 5	Yes.	No.	No.	Yes.	No.
2-aminoethanol	2.5 - 5	Yes.	No.	No.	Yes.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	2-(2-butoxyethoxy)ethanol	112-34-5	4.75
Supplier notification	2-(2-butoxyethoxy)ethanol	112-34-5	4.75

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: SODIUM HYDROXIDE; ETHANOLAMINE; BUTANE

New York : The following components are listed: Sodium hydroxide

New Jersey : The following components are listed: SODIUM HYDROXIDE; CAUSTIC SODA; ETHANOLAMINE; ETHANOL, 2-AMINO-; GLYCOL ETHERS; BUTANE

Pennsylvania : The following components are listed: SODIUM HYDROXIDE (NA(OH)); ETHANOL, 2-AMINO-; GLYCOL ETHERS; BUTANE

Label elements

Signal word : DANGER

Hazard statements : CORROSIVE CAUSES EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. CONTENTS UNDER PRESSURE.

Precautionary measures : Keep out of the reach of children. Do not puncture or incinerate container. Do not expose to heat or store at temperatures above 120 °F. Use only with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing spray. Wear suitable gloves. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

371752PSDS v3.0

16. Other information

Hazardous Material :
Information System (U.S.A.)

Health	3
Flammability	1
Physical hazards	0
Personal protection	D

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection :
Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue : 13/10/2014.

Date of previous issue : 29/05/2013

Version : 3

Prepared by : Reckitt Benckiser LLC.
 Product Safety Department
 1 Philips Parkway
 Montvale, New Jersey 07646-1810 USA.
 FAX: 201-476-7770

Revision comments : Update as per US GHS

▣ Indicates information that has changed from previously issued version.

Notice to reader

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.

371752PSDS v3.0

16. Other information



RB is a member of the CSPA Product Care Product Stewardship Program.

Safety Data Sheet



1. Identification

Product Name:	STRUST +SSPR 6PK GLOSS CRYSTAL CLEAR	Revision Date:	10/9/2015
Product Identifier:	7701830	Supersedes Date:	10/9/2015
Product Use/Class:	Topcoat/Aerosols		
Supplier:	Rust-Oleum Corporation 11 Hawthorn Parkway Vernon Hills, IL 60061 USA	Manufacturer:	Rust-Oleum Corporation 11 Hawthorn Parkway Vernon Hills, IL 60061 USA
Preparer:	Regulatory Department		
Emergency Telephone:	24 Hour Hotline: 847-367-7700		

2. Hazard Identification

Classification

Symbol(s) of Product



Signal Word

Danger

GHS HAZARD STATEMENTS

Flammable Aerosol, category 1	H222	Extremely flammable aerosol.
Compressed Gas	H280	Contains gas under pressure; may explode if heated.
Skin Irritation, category 2	H315	Causes skin irritation.
Eye Irritation, category 2	H319	Causes serious eye irritation.
STOT, single exposure, category 3, NE	H336	May cause drowsiness or dizziness.
Germ Cell Mutagenicity, category 1B	H340	May cause genetic defects. Classified as mutagenic Category 1 if one ingredient is present at or above 0.1%. Applies to liquids, solids (w/w units) and gases (v/v). The substance may also have its own exposure limit. Routes of exposure are dependent on ingredient form.
Carcinogenicity, category 1B	H350	May cause cancer. Classified as carcinogenic Category 1 on the basis of epidemiological and/or animal data. Mixtures are classified as carcinogenic when at least 1 ingredient has been classified as carcinogenic and is present at 0.1% or above. Routes of exposure are dependent on ingredient form.
Reproductive Toxicity, category 2	H361	Suspected of damaging fertility or the unborn child. Classified Category 2 suspected human reproductive toxicant irreversible effects such as structural malfunctions, embryo/foetal lethality, post natal functional deficiencies.
STOT, repeated exposure, category 2	H373	May cause damage to organs through prolonged or repeated exposure.

GHS LABEL PRECAUTIONARY STATEMENTS

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.

P251	Do not pierce or burn, even after use.
P260	Do not breathe dust, fumes, gases, mists, vapors, or spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P362	Take off contaminated clothing.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P410+P403	Protect from sunlight. Store in a well-ventilated place.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50°C / 122°F.

3. Composition/Information On Ingredients

HAZARDOUS SUBSTANCES

<u>Chemical Name</u>	<u>CAS-No.</u>	<u>Wt.% Range</u>	<u>GHS Symbols</u>	<u>GHS Statements</u>
Acetone	67-64-1	25-50	GHS02-GHS07	H225-319-336
Propane	74-98-6	10-25	GHS04	H280
Toluene	108-88-3	10-25	GHS02-GHS07-GHS08	H225-304-315-332-336-361-373
n-Butyl Acetate	123-86-4	2.5-10	GHS02-GHS07	H226-319-336
n-Butane	106-97-8	2.5-10	GHS04	H280
Solvent Naphtha, Light Aromatic	64742-95-6	1.0-2.5	GHS07-GHS08	H304-332-340-350
1,2,4-Trimethylbenzene	95-63-6	1.0-2.5	GHS02-GHS07-GHS08	H226-304-315-319-332-335
Aliphatic Hydrocarbon	64742-89-8	1.0-2.5	GHS08	H304-340-350

4. First-aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention. If swallowed, get medical attention.

5. Fire-fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLASH POINT IS LESS THAN 20°F. EXTREMELY FLAMMABLE LIQUID AND VAPOR! Water spray may be ineffective. Closed containers may explode when exposed to extreme heat due to buildup of steam. Closed containers may explode when exposed to extreme heat. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flash back. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Perforation of the pressurized container may cause bursting of the can. No unusual fire or explosion hazards noted.

SPECIAL FIREFIGHTING PROCEDURES: Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion. Full protective equipment including self-contained breathing apparatus should be used. Evacuate area and fight fire from a safe distance. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Ventilate area, isolate spilled material, and remove with inert absorbent. Dispose of contaminated absorbent, container, and unused contents in accordance with local, state, and federal regulations.

7. Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.

STORAGE: Store in a dry, well ventilated place. Keep container tightly closed when not in use. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Contents under pressure. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of NFPA Class I flammable liquids. Keep away from heat, sparks, flame and sources of ignition. Avoid excess heat. Product should be stored in tightly sealed containers and protected from heat, moisture, and foreign materials.

8. Exposure Controls/Personal Protection

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV- TWA	ACGIH TLV- STEL	OSHA PEL-TWA	OSHA PEL- CEILING
Acetone	67-64-1	30.0	250 ppm	500 ppm	1000 ppm	N.E.
Propane	74-98-6	20.0	N.E.	N.E.	1000 ppm	N.E.
Toluene	108-88-3	20.0	20 ppm	N.E.	200 ppm	300 ppm
n-Butyl Acetate	123-86-4	10.0	150 ppm	200 ppm	150 ppm	N.E.
n-Butane	106-97-8	10.0	N.E.	1000 ppm	N.E.	N.E.
Solvent Naphtha, Light Aromatic	64742-95-6	5.0	N.E.	N.E.	N.E.	N.E.
1,2,4-Trimethylbenzene	95-63-6	5.0	N.E.	N.E.	N.E.	N.E.
Aliphatic Hydrocarbon	64742-89-8	5.0	N.E.	N.E.	N.E.	N.E.

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof ventilation equipment. Provide general dilution of local exhaust ventilation in volume and pattern to keep TLV of hazardous ingredients below acceptable limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

9. Physical and Chemical Properties

Appearance:	Aerosolized Mist	Physical State:	Liquid
Odor:	Solvent Like	Odor Threshold:	N.E.
Relative Density:	0.747	pH:	N.A.
Freeze Point, °C:	N.D.	Viscosity:	No Information
Solubility in Water:	Slight	Partition Coefficient, n-octanol/water:	N.D.
Decomposition Temp., °C:	N.D.	Explosive Limits, vol%:	0.9 - 13.0
Boiling Range, °C:	-24 - 375	Flash Point, °C:	-96
Flammability:	Supports Combustion	Auto-ignition Temp., °C:	N.D.
Evaporation Rate:	Faster than Ether	Vapor Pressure:	N.D.
Vapor Density:	Heavier than Air		

(See "Other information" Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid temperatures above 120°F (49°C). Avoid contact with strong acid and strong bases. Avoid all possible sources of ignition.

INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

HAZARDOUS DECOMPOSITION: By open flame, carbon monoxide and carbon dioxide. When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

11. Toxicological information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes Serious Eye Irritation

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May be absorbed through the skin in harmful amounts. May cause skin irritation. Allergic reactions are possible.

EFFECTS OF OVEREXPOSURE - INHALATION: Harmful if inhaled. High gas, vapor, mist or dust concentrations may be harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Prolonged or excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis, and blurred vision) and/or damage. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES

The acute effects of this product have not been tested. Data on individual components are tabulated below:

<u>CAS-No.</u>	<u>Chemical Name</u>	<u>Oral LD50</u>	<u>Dermal LD50</u>	<u>Vapor LC50</u>
67-64-1	Acetone	5800 mg/kg Rat	N.I.	50.1 mg/L Rat
74-98-6	Propane	N.I.	N.I.	658 mg/L Rat
108-88-3	Toluene	2600 mg/kg Rat	12000 mg/kg Rabbit	12.5 mg/L Rat
123-86-4	n-Butyl Acetate	10768 mg/kg Rat	>17600 mg/kg Rabbit	> 21 mg/L Rat
106-97-8	n-Butane	N.I.	N.I.	658 mg/L Rat
64742-95-6	Solvent Naphtha, Light Aromatic	8400 mg/kg Rat	>2000 mg/kg Rabbit	N.I.
95-63-6	1,2,4-Trimethylbenzene	3280 mg/kg Rat	>3160 mg/kg Rabbit	18 mg/L Rat
64742-89-8	Aliphatic Hydrocarbon	N.I.	3000 mg/kg Rabbit	N.I.

N.I. - No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Product is a mixture of listed components.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of material in accordance to local, state, and federal regulations and ordinances. Do not allow to enter waterways, wastewater, soil, storm drains or sewer systems.

14. Transport Information

	<u>Domestic (USDOT)</u>	<u>International (IMDG)</u>	<u>Air (IATA)</u>	<u>TDG (Canada)</u>
UN Number:	N.A.	1950	1950	N.A.
Proper Shipping Name:	Paint Products in Limited Quantities	Aerosols	Aerosols	Paint Products in Limited Quantities
Hazard Class:	N.A.	2.1	2.1	N.A.
Packing Group:	N.A.	N.A.	N.A.	N.A.
Limited Quantity:	Yes	Yes	Yes	Yes

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard, Pressure Hazard, Acute Health Hazard, Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

<u>Chemical Name</u>	<u>CAS-No.</u>
Toluene	108-88-3
1,2,4-Trimethylbenzene	95-63-6

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

No TSCA 12(b) components exist in this product.

16. Other Information

HMIS RATINGS

Health: 2* Flammability: 4 Physical Hazard: 0 Personal Protection: X

NFPA RATINGS

Health: 2 Flammability: 4 Instability: 0

VOLATILE ORGANIC COMPOUNDS, g/L: 586

SDS REVISION DATE: 10/9/2015

REASON FOR REVISION: Substance and/or Product Properties Changed in Section(s):
02 - Hazard Identification
03 - Composition/Information on Ingredients
Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

Reviewed on 10/02/2014

1 Identification of substance

- **Product details**
- **Trade name:** Argon
- **Article number:** 002-01-0001
- **Creation date:** 05/18/2006
- **Manufacturer/Supplier:**

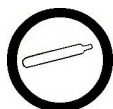
Linde Canada Limited	Linde
5860 Chedworth Way	575 Mountain Avenue
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974
Telephone (905) 501-1700	Telephone (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:	24-HOUR EMERGENCY TELEPHONE NUMBER
: (905) 501-0802	CHEMTREC (800) 424-9300 OR
	Linde National Operations Center (800) 232-4726
- Pse ensure that this MSDS is received by the appropriate person.
- **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

- **Chemical characterization:**
- **CAS No. Description**
7440-37-1 Argon
- **Identification number(s)**
- **EINECS Number:** 231-147-0

3 Hazards identification

- **Hazard description:**
- **WHMIS-symbols:**
A - Compressed gas



- **HMIS-ratings (scale 0 - 4)**

HEALTH	0	Health = 0
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

- **NFPA ratings (scale 0 - 4)**

Health = 0
Fire = 0
Reactivity = 0

- **Information pertaining to particular dangers for man and environment:** Not applicable.
- **Classification system:**
The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

(Contd. on page 2)

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

Reviewed on 10/02/2014

Trade name: Argon

· GHS label elements Void

(Contd. of page 1)

4 First aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable

5 Fire fighting measures

- **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.
- **Measures for cleaning/collecting:** Ensure adequate ventilation.
- **Additional information:** No dangerous substances are released.

7 Handling and storage

- **Handling:**
- **Information for safe handling:**
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**
Keep cylinder valve tightly closed.
Store in accordance with local fire code and/or building code or any pertaining regulations.

CDN

(Contd. on page 3)

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

Reviewed on 10/02/2014

Trade name: Argon

(Contd. of page 2)

8 Exposure controls and personal protection

· Additional information about design of technical systems:

Adequate local ventilation.

Safety showers and eyewash stations should be nearby.

· Components with limit values that require monitoring at the workplace:

7440-37-1 Argon (60 - 100%)

EL Simple asphyxiant

· **Additional information:** The lists that were valid during the creation were used as basis.

· Personal protective equipment:

· General protective and hygienic measures:

Protective clothing and PPE should be kept free of oil and grease, generally in clean condition

PPE should be inspected and maintained regularly to retain effectiveness.

· Breathing equipment:

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

· Protection of hands:



Protective gloves.

· Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· Eye protection: Safety glasses

9 Physical and chemical properties

· General Information

Form: Gaseous.

Color: Colorless

Odor: Odorless

· Change in condition

Melting point/Melting range: -189.2°C

Boiling point/Boiling range: -185°C

· **Flash point:** Not applicable.

· **Danger of explosion:** Product does not present an explosion hazard.

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

· Materials to be avoided:

· **Dangerous reactions** No dangerous reactions known.

· **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

· Acute toxicity:

· **LD/LC50 values that are relevant for classification:** LC50 - None available

(Contd. on page 4)

CDN

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

Reviewed on 10/02/2014

Trade name: Argon

(Contd. of page 3)

- **Primary irritant effect:**
- **on the skin:** No irritating effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** None applicable.

14 Transport information

- **TDG and DOT regulations:**



- **Hazard class:** 2.2
- **Identification number:** UN1006
- **Packing group:** -
- **Proper shipping name (technical name):** ARGON, COMPRESSED
- **Label** 2.2
- **Packaging group:** -

- **Maritime transport IMDG:**



- **IMDG Class:** 2.2
- **UN Number:** 1006
- **Label** 2.2
- **Packaging group:** -
- **EMS Number:** F-C,S-V
- **Marine pollutant:** No

(Contd. on page 5)

CDN

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

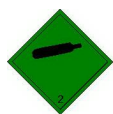
Reviewed on 10/02/2014

Trade name: Argon

(Contd. of page 4)

· Proper shipping name: ARGON, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



· ICAO/IATA Class: 2.2

· UN/ID Number: 1006

· Label: 2.2

· Packaging group: -

· Proper shipping name: ARGON, COMPRESSED

· UN "Model Regulation": UN1006, ARGON, COMPRESSED, 2.2

15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Cancerogenity categories

· EPA (Environmental Protection Agency)

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

· Canadian substance listings:

· Canadian Domestic Substances List (DSL)

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

(Contd. on page 6)

CDN

Material Safety Data Sheet

Printing date 10/02/2014

Version 8

Reviewed on 10/02/2014

Trade name: Argon

(Contd. of page 5)

· Canadian Ingredient Disclosure list (limit 1%)

Substance is not listed.

· Product related hazard informations:

Observe the general safety regulations when handling chemicals.

The substance is not subject to classification according to the sources of literature known to us.

The product was 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.

· Safety phrases:

Keep container tightly closed in a cool place.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· Department issuing MSDS: Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

EL: Exposure Limit per ACGIH TLV

EV: Permissible Exposure Limit per OSHA

N/A: Not Applicable

CDN

SAFETY DATA SHEET

REV. 0 Issued: March 6, 2015

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

1. IDENTIFICATION

Product identifier	Potassium Hydroxide Solution
Other means of identification	
Synonyms	Caustic potash solution, KOH, Potash lye, Lye, Lye solution, aqueous alkali metal hydroxide
Recommended use	Manufacture of biodiesel, soft soaps, fine chemicals, fertilizers, electrolyte for batteries.
Recommended restrictions	None known
Manufacturer/Importer/Supplier/Distributor information	
Manufacturer	
Company name	ERCO Worldwide
Address	302 The East Mall Suite 200 Toronto, ON M9B 6C7 Canada
Telephone	Information #: (416) 239-7111 (Monday – Friday 8:00 am – 5:00pm EST)
Website	http://www.ercoworldwide.com
E-mail	productinfo@ercoworldwide.com
Emergency phone number	24 Hr. #: Canada: 613-996-6666 (CANUTEC) USA: 1-800-424-9300 (CHEMTREC)
Supplier	Refer to Manufacturer

2. HAZARD(S) IDENTIFICATION

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
Environmental hazards	Not currently regulated by OSHA, refer to Section 12 for additional information.	
OSHA defined hazards	This mixture does not meet the classification criteria according to OSHA HazCom 2012.	

Label elements

Signal word	Danger
Hazard statement	May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Do not breathe mist. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/clothing and eye/face protection.
Response	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant container with a resistant inner liner.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	No OSHA defined hazard classes. Other hazards which do not result in classification: Contact with most metals will generate flammable hydrogen gas. Contact with water will generate considerable heat. Reacts vigorously or violently with many organic and inorganic chemicals such as: acids, acrolein, acrylonitrile, chlorinated hydrocarbons (e.g. 1,2 dichloroethylene), chlorine dioxide, maleic anhydride, nitroethane, nitroparaffins, 2-nitrophenol, nitropropane, phosphorus, potassium persulfate, and tetrahydrofuran (containing peroxides). Chronic skin contact with low concentrations may cause dermatitis.
Supplemental information	Not applicable.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Potassium Hydroxide	Caustic Potash Potassium Hydrate Lye Potash Potash Lye	1310-58-3	50 or less
Water	Dihydrogen oxide	7732-18-5	50 or less

4. FIRST-AID MEASURES

Inhalation

Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact

Take off immediately all contaminated clothing. Immediately flush skin with running water for at least 20 minutes. Cover wound with sterile dressing. Do not rub area of contact. Wash contaminated clothing before reuse. Leather and shoes that have been contaminated with the solution may need to be destroyed. Call a physician or poison control center immediately.

Eye contact

Immediately flush eyes with plenty of water for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Take care not to rinse contaminated water into the unaffected eye or onto the face. Call a physician or Poison Control Center immediately.

Ingestion

If swallowed: Rinse mouth. Do NOT induce vomiting. Never give anything by mouth to a victim who is unconscious or is having convulsions. Call a physician or poison control center immediately.

Most important symptoms/effects, acute and delayed

Inhalation of mists can cause severe respiratory irritation. Symptoms may include coughing, choking and wheezing. Inhalation could result in pulmonary edema (fluid accumulation).

Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. Corrosive to the eyes and may cause severe damage including blindness. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May be harmful or fatal if swallowed. May cause severe irritation and corrosive damage in the mouth,

throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death.

Indication of immediate medical attention and special treatment needed

Immediate medical attention is required. Causes chemical burns. May be harmful or fatal if swallowed. Symptoms may be delayed.

General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use as appropriate: Water Spray or Fog. Alcohol resistant foam. Dry chemical powder. Use water with caution. Contact with water will generate considerable heat.

Unsuitable extinguishing media

Carbon dioxide (CO₂).

Use chemical extinguishing agents with caution. Some chemical extinguishing agents may react with this material.

Specific hazards arising from the chemical

Not considered flammable. Contact with most metals will generate flammable hydrogen gas. Contact with water will generate considerable heat. The heat that is generated may be sufficient enough to ignite nearby combustible materials. Reacts vigorously or violently with many organic and inorganic chemicals such as: acids, acrolein, acrylonitrile, chlorinated hydrocarbons (e.g. 1,2 dichloroethylene), chlorine dioxide, maleic anhydride, nitroethane, nitroparaffins, 2-nitrophenol, nitropropane, phosphorus, potassium persulfate, and tetrahydrofuran (containing peroxides). Toxic fumes, gases or vapours may evolve on burning.

Special protective equipment and precautions for firefighters

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. A full-body chemical resistant suit should be worn.

Fire-fighting equipment/instructions

Fight fire with normal precautions from a reasonable distance. Evacuate the area promptly. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers. Do not allow run-off from firefighting to enter drains or water courses. Dike for water control.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

Hazardous combustion products

None known.

In the event of fire the following can be released: Potassium oxides.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Immediately evacuate personnel to safe areas. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Ventilate the area. Remove sources of ignition. Stop leak if you can do so without risk. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Use water spray to reduce vapors or divert vapor cloud drift.

Small Spills: Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand). Dilute alkali with water and neutralize with acids (e.g. acetic acid / vinegar).

Large Spills: Prevent entry into waterways, sewer, basements or confined areas. If not recoverable, dilute with water or flush to holding area and neutralize. Remove with vacuum trucks or pump to storage/salvage vessels. Contact the proper local authorities.

Never return spills to original containers for re-use. Contaminated absorbent material may pose the same hazards as the spilled product. For waste disposal, see Section 13.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Contact local authorities in case of spillage to drain/aquatic environment.

7. HANDLING AND STORAGE

Precautions for safe handling

Wear chemically resistant protective equipment during handling. Wear protective gloves/clothing and eye/face protection. Do not breathe mist. Do not taste or swallow. Avoid contact with eyes, skin and clothing. Keep away from heat. Keep away from metals and other incompatibles. When preparing or diluting solution, always add to water, slowly and with stirring. Use cold water to prevent excessive heat generation. Never add water to the

product. Label containers appropriately. Wash thoroughly after handling. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store locked up. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Store away from incompatible materials (see Section 10 of the SDS). Store in original tightly closed container. Store in corrosive resistant container with a resistant inner liner.

Suitable container and packaging materials for safe storage: Polyvinyl chloride (PVC). Polypropylene. Polytetrafluoroethylene (PTFE). Mild steel may be used if the storage temperature does not exceed 50°C (122°F). For temperatures above 50°C (122°F), materials such as nickel or lined steel may be required.

Aluminum equipment should not be used for storage and/or transfer.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Occupational exposure limits****US. ACGIH Threshold Limit Values**

Components	Type	Value
Potassium Hydroxide (CAS 1310-58-3)	Ceiling	2 mg/m ³

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Potassium Hydroxide (CAS 1310-58-3)	TWA	2 mg/m ³

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment**Eye/face protection**

Wear eye/face protection. Chemical goggles and face shield are recommended.

Skin protection**Hand protection**

Wear appropriate chemical resistant gloves. Wear as appropriate: Butyl rubber. Neoprene. Nitrile, Polyvinyl chloride (PVC), Viton rubber (fluor rubber). Advice should be sought from glove suppliers.

Other

Where contact is likely, wear chemical-resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment. A NIOSH/MSHA approved air-purifying respirator with the appropriate chemical cartridges or a positive-pressure, air-supplied respirator may be used to reduce exposure. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134). Advice should be sought from respiratory protection specialists.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Do not breathe mist. Avoid contact with eyes, skin and clothing. When using, do not eat, drink or smoke. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove soiled clothing and wash it thoroughly before reuse. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear to white/light gray, viscous liquid
Physical state	Liquid
Form	Viscous liquid
Color	Clear to white/light gray
Odor	Odorless.
Odor threshold	Not Available
pH	> 14 (at high alkali concentration in water pH scale is not applicable)
Melting point/freezing point	39.2 °F (4 °C) (50% solution) -22 °F (-30 °C) (45% solution)
Initial boiling point and boiling range	269.6 °F (132 °C) (45% solution) 289.4 °F (143 °C) (50% solution)
Flash point	Not Applicable (does not burn)
Evaporation rate	Not Available
Flammability (solid, gas)	Not Applicable

Upper/lower flammability or explosive limits**Flammability limit – lower (%)** Not Applicable**Flammability limit – upper (%)** Not Applicable**Explosive limit - lower (%)** Not Available**Explosive limit - upper (%)** Not Available**Vapor pressure** 27 mm Hg @ 60°C / 140°F (50% solution)

39 mm Hg @ 60°C / 140°F (45% solution)

Vapor density Not available**Relative density** 1.457 g/cm³ @ 15.6°C / 60°F (45% solution)1.516 g/cm³ @ 15.6°C / 60°F (50% solution)**Solubility(ies)****Solubility (water)** Soluble in all proportions.**Solubility (other)** Soluble in ethanol, methanol and glycerol. Insoluble in diethyl ether and ammonia.**Partition coefficient (n-octanol/water)** Not Available**Auto-ignition temperature** Not Applicable**Decomposition temperature** Not Available**Viscosity** 5.25 cSt @ 20°C / 68°F (50% solution)**Other information****Solubility (other)** Soluble in ethanol, methanol and glycerol. Insoluble in diethyl ether and ammonia.**Specific gravity** 1.46 @ 15.6°C / 60°F (45% solution)

1.52 @ 15.6°C / 60°F (50% solution)

10.STABILITY AND REACTIVITY

Reactivity

Contact with most metals will generate flammable hydrogen gas. Contact with water will generate considerable heat. May be corrosive to metals. May be corrosive to: Aluminum. Bronze. Brass. Zinc.

Chemical stability

Material is stable under normal conditions. Rapidly absorbs moisture and carbon dioxide from the air forming potassium carbonate.

Possibility of hazardous reactions

Reacts vigorously or violently with many organic and inorganic chemicals such as: acids, acrolein, acrylonitrile, chlorinated hydrocarbons (e.g. 1,2 dichloroethylene), chlorine dioxide, maleic anhydride, nitroethane, nitroparaffins, 2-nitrophenol, nitropropane, phosphorus, potassium persulfate, and tetrahydrofuran (containing peroxides). Attacks plastics, such as polyethylene terephthalate, polybutylene terephthalate, thermoset polyesters (bisphenol-A fumarate (50-100%), isophthalic acid and general purpose), polyamide-imide (Torlon), polyurethane (rigid) and thermoset chlorinated polyester; elastomers, such as styrene-butadiene (SBR),

polyacrylate, polyurethane, fluorosilicone, silicone, chlorinated polyethylene and soft rubber; and coatings, such as polyester and vinyls (5-100%) and epoxy (general purpose and chemical resistant epoxy) (50-100%) at room temperature.

Conditions to avoid

Contact with incompatible materials. Avoid high temperatures. Do not use in areas without adequate ventilation

Incompatible materials

Metals. Water, moisture. Acrolein. Acrylonitrile. Chlorinated hydrocarbons. Chlorine dioxide. Maleic anhydride. Nitroethane. Nitroparaffins. Nitropropane. 2-nitrophenol. Phosphorus. Potassium persulfate. Tetrahydrofuran.

Hazardous decomposition products

None known.

In the event of fire the following can be released: Potassium oxides.

11.TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation

May cause severe irritation to the nose, throat, and respiratory tract.

Skin contact

Causes severe skin burns. Not expected to be absorbed through the skin.

Eye contact

Causes serious eye damage.

Ingestion

Harmful if swallowed. Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation of mists can cause severe respiratory irritation. Symptoms may include coughing, choking and wheezing.

Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. Corrosive to the eyes and may cause severe damage including blindness. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

Information on toxicological effects

Acute toxicity

Harmful if swallowed.

The below product data is the calculated ATE values for this mixture. Individual ingredient component data appears below the product mixture ATE values.

Product	Species	Test Results
Potassium Hydroxide Solution (CAS Mixture)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2520 mg/kg
<i>Oral</i>		
LD50	Rat	410 mg/kg
Components	Species	Test Results
Potassium Hydroxide (CAS 1310 58-3)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 1260 mg/kg
<i>Inhalation</i>		
LC50		No Data in Literature
<i>Oral</i>		
LD50	Rat	205 mg/kg
Water (CAS 7732-18-5)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	Not available.
<i>Inhalation</i>		
LC50	Rat	Not available.
<i>Oral</i>		
LD50	Rat	> 89840 mg/kg

Skin corrosion/irritation

Hazardous by OSHA criteria.

Skin corrosion/irritation - Category 1. Causes severe skin burns.

Serious eye damage/eye irritation

Hazardous by OSHA criteria. Serious eye damage/eye irritation - Category 1 Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization

Not expected to be a respiratory sensitizer.

Skin sensitizer

This product is not expected to be a skin sensitizer.

Germ cell mutagenicity

Not expected to be mutagenic in humans.

Carcinogenicity

This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity

This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure

Hazardous by OSHA criteria.

Specific Target Organ Toxicity (STOT), Single Exposure, Category 3. May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

Not classified as a specific target organ toxicity -repeated exposure.

Aspiration toxicity

This product is not classified as an aspiration hazard.

Chronic effects

Chronic skin contact with low concentrations may cause dermatitis act.

12.ECOLOGICAL INFORMATION

Ecotoxicity

Because of the high pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. However, may be neutralized by naturally occurring acidity in the environment. The ingredient ecotoxicity data appearing below is expected to be primarily associated with ph.

Components		Species	Test Results
Potassium Hydroxide (CAS 1310-58-3)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Ceriodaphnia dubia)	56 mg/l, 48 hours
Fish	LC50	Western mosquitofish (Gambusia affinis)	80 mg/l, 96 hours

Persistence and degradability

No data is available on the degradability of this product. Biodegradation is not applicable to inorganic substances.

Bioaccumulative potential

No accumulation in living organisms is expected due to high solubility and dissociation properties.

Mobility in soil

High water solubility indicates a high mobility in soil.

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13.DISPOSAL CONSIDERATIONS

Disposal instructions

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal.

Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14.TRANSPORT INFORMATION

DOT

UN number	UN1814
UN proper shipping name	Potassium hydroxide solution
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling. US CERCLA Reportable Quantity (RQ): 1000 lbs / 454 kg
Special provisions	B2; IB2; N34; T7; TP2
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1814
UN proper shipping name	Potassium hydroxide solution
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Packing group	II
Environmental hazards	No
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed
Cargo aircraft only	Allowed

IMDG

UN number	UN1814
UN proper shipping name	Potassium hydroxide solution
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Read safety instructions, SDS and emergency procedures before

**Annex II of MARPOL 73/78 and
the IBC Code
DOT**

handling.
Not available.



IATA; IMDG



15. REGULATORY INFORMATION

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Potassium hydroxide (CAS 1310-58-3) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes

Delayed Hazard - No

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Potassium hydroxide (CAS 1310-58-3)

US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

US. Pennsylvania RTK – Hazardous Substances

Potassium hydroxide (CAS 1310-58-3)

US. Rhode Island RTK

Potassium hydroxide (CAS 1310-58-3)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	YES
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16.OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST VERSION

Issue date	03-06-2015
Version #	0
Revision Indicator	New safety data sheet.
List of abbreviations	ACGIH: American Conference of Governmental Industrial Hygienists CAS: Chemical Abstract Services CERCLA: Comprehensive Environmental Response, Compensation and Liability Act of 1980 CFR: Code of Federal Regulations DOT: Department of Transportation DSL: Domestic Substance List

EINECS: European Inventory of Existing Commercial chemical
Substances EPA: Environmental Protection Agency
EPCRA: Emergency Planning and Community Right-to-Know Act
HSDB® - Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
IBC: Intermediate Bulk Container
ICAO: International Civil Aviation Organization
IMDG: International Maritime Dangerous Goods LC: Lethal
Concentration
LD: Lethal Dose
NIOSH: National Institute of Occupational Safety and Health
NOEC: No observable effect concentration
NTP: National Toxicology Program
OECD: Organization for Economic Cooperation and Development
OSHA: Occupational Safety and Health Administration
PPE: Personal Protective Equipment
RCRA: Registry of Toxic Effects of Chemical Substances
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
SDS: Safety Data Sheet
STEL: Short Term Exposure Limit
TLV: Threshold Limit Values
TWA: Time Weighted Average

References

ACGIH Documentation of the Threshold Limit Values and Biological
Exposure Indices (2014) Canadian Centre for Occupational Health and
Safety, CCIInfoWeb Databases, 2014 (Chempendium, RTECs, HSDB,
INCHEM)
Material Safety Data Sheet from manufacturer.
OECD - The Global Portal to Information on Chemical Substances -
eChemPortal, 2014.

Disclaimer

Information on this form is furnished in compliance with the Hazard Communication Standard and is not to be used for any other purpose, nor is it to be reproduced or published.

ERCO Worldwide, a division of Superior Plus LP, assumes no responsibility for injury to or death of the recipient of this material or third persons, or for any loss of damage, howsoever, caused, and the user, owner, bailee and their respective employees and agents assume all such risks if reasonable safety procedures are not adhered to.

In addition, ERCO Worldwide, a division of Superior Plus LP, assumes no responsibility for injury to or death of the recipient of this material or third persons, or for any loss or damage to any property, or for any consequential damage resulting from any abnormal user or theft of the material, and the user, owner, bailee and their respective employees and agents assume all such risks even when caused by negligence, omission, default or error in judgement of ERCO Worldwide, a division of Superior Plus LP or its agents or servants.

Each recipient should carefully review the information, data and recommendations in the specific context of the intended use.

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Lead Acid Battery Wet, Filled With Acid
OTHER PRODUCT NAMES: Electric Storage Battery, SLI or Industrial Battery, UN2794

MANUFACTURER: East Penn Manufacturing Company, Inc.
DIVISION: Dekal Road
ADDRESS: Lyon Station, PA 19536 USA

EMERGENCY TELEPHONE NUMBERS: US: CHEMTREC 1-800-424-9300
CN: CHEMTREC 1-800-424-9300
Outside US: 1-703-527-3887

NON-EMERGENCY HEALTH/SAFETY INFORMATION: 1-610-682-6361

CHEMICAL FAMILY: This product is a wet lead acid storage battery. May also include gel/absorbed electrolyte type lead acid battery types.

PRODUCT USE: Industrial/Commercial electrical storage batteries.

This product is considered a Hazardous Substance, Preparation or Article that is regulated under US-OSHA; CAN-WHMIS; IOSH; ISO; UK-CHIP; or EU Directives (67/548/EEC-Dangerous Substance Labelling, 98/24/EC-Chemical Agents at Work, 99/45/EC-Preparation Labelling, 2001/58/EC-MSDS Content, and 1907/2006/EC-REACH), and an MSDS/SDS is required for this product considering that when used as recommended or intended, or under ordinary conditions, it may present a health and safety exposure or other hazard.

Additional Information

This product may not be compatible with all environments, such as those containing liquid solvents or extreme temperature or pressure. Please request information if considering use under extreme conditions or use beyond current product labelling.

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification:

Health	Environmental	Physical
Acute Toxicity – Not listed (NL) Eye Corrosion – Corrosive* Skin Corrosion – Corrosive* Skin Sensitization – NL Mutagenicity/Carcinogenicity – NL Reproductive/Developmental – NL Target Organ Toxicity (Repeated) – NL	Aquatic Toxicity – NL	NFPA – Flammable gas, hydrogen (during charging) CN - NL EU - NL

*as sulfuric acid

GHS Label: Lead Acid Battery, Wet

Symbols: C (Corrosive)



Hazard Statements

Contact with internal components may cause irritation of severe burns. Irritating to eyes, respiratory system, and skin.

Precautionary Statements

Keep out of reach of children. Keep containers tightly closed. Avoid heat, sparks, and open flame while charging batteries. Avoid contact with internal acid.

EMERGENCY OVERVIEW: May form explosive air/gas mixture during charging. Contact with internal components may cause irritation or severe burns. Irritating to eyes, respiratory system, and skin. Prolonged inhalation or ingestion may result in serious damage to health. Pregnant

MATERIAL SAFETY DATA SHEET

LEAD ACID BATTERY WET, FILLED WITH ACID

(US, CN, EU Version for International Trade)

women exposed to internal components may experience reproductive/developmental effects.

POTENTIAL HEALTH EFFECTS:

EYES: Direct contact of internal electrolyte liquid with eyes may cause severe burns or blindness.
SKIN: Direct contact of internal electrolyte liquid with the skin may cause skin irritation or damaging burns.
INGESTION: Swallowing this product may cause severe burns to the esophagus and digestive tract and harmful or fatal lead poisoning. Lead ingestion may cause nausea, vomiting, weight loss, abdominal spasms, fatigue, and pain in the arms, legs and joints.
INHALATION: Respiratory tract irritation and possible long-term effects.

ACUTE HEALTH HAZARDS:

Repeated or prolonged contact may cause mild skin irritation.

CHRONIC HEALTH HAZARDS:

Lead poisoning if persons are exposed to internal components of the batteries. Lead absorption may cause nausea, vomiting, weight loss, abdominal spasms, fatigue, and pain in the arms, legs and joints. Other effects may include central nervous system damage, kidney dysfunction, and potential reproductive effects. Chronic inhalation of sulfuric acid mist may increase the risk of lung cancer.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Respiratory and skin diseases may predispose the user to acute and chronic effects of sulfuric acid and/or lead. Children and pregnant women must be protected from lead exposure. Persons with kidney disease may be at increased risk of kidney failure.

Additional Information

No health effects are expected related to normal use of this product as sold.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENTS (Chemical/Common Names):</u>	<u>CAS No.:</u>	<u>% by Wt:</u>	<u>EC No.:</u>
Lead, inorganic	7439-92-1	43–70 (average: 65)	231-100-4
Sulfuric acid	7664-93-9	20–44 (average: 25)	231-639-5
Antimony	7440-36-0	0–4 (average: 1)	231-146-5
Arsenic	7440-38-2	<0.01	231-148-6
Polypropylene	9003-07-0	5–10 (average: 8)	NA
NA: Not applicable; ND: Not determined			

Additional Information

These ingredients reflect components of the finished product related to performance of the product as distributed into commerce.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush eyes with large amounts of water for at least 15 minutes. Seek immediate medical attention if eyes have been exposed directly to acid.
SKIN CONTACT: Flush affected area(s) with large amounts of water using deluge emergency shower, if available, shower for at least 15 minutes. Remove contaminated clothing. If symptoms persist, seek medical attention.
INGESTION: If swallowed, give large amounts of water. Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death.
INHALATION: If breathing difficulties develop, remove person to fresh air. If symptoms persist, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

SUITABLE/UNSUITABLE EXTINGUISHING MEDIA:

Dry chemical, carbon dioxide, water, foam. Do not use water on live electrical circuits.

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

SPECIAL FIREFIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:

Use appropriate media for surrounding fire. Do not use carbon dioxide directly on cells. Avoid breathing vapours. Use full protective equipment (bunker gear) and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Batteries evolve flammable hydrogen gas during charging and may increase fire risk in poorly ventilated areas near sparks, excessive heat or open flames.

SPECIFIC HAZARDS IN CASE OF FIRE:

Thermal shock may cause battery case to crack open. Containers may explode when heated.

Additional Information

Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Avoid Contact with Skin. Neutralize any spilled electrolyte with neutralizing agents, such as soda ash, sodium bicarbonate, or very dilute sodium hydroxide solutions.

ENVIRONMENTAL PRECAUTIONS:

Prevent spilled material from entering sewers and waterways.

SPILL CONTAINMENT & CLEANUP METHODS/MATERIALS:

Add neutralizer/absorbent to spill area. Sweep or shovel spilled material and absorbent and place in approved container. Dispose of any non-recyclable materials in accordance with local, state, provincial or federal regulations.

Additional Information

Lead acid batteries and their plastic cases are recyclable. Contact your East Penn representative for recycling information.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING AND STORAGE:

- Keep containers tightly closed when not in use.
- If battery case is broken, avoid contact with internal components.
- Do not handle near heat, sparks, or open flames.
- Protect containers from physical damage to avoid leaks and spills.
- Place cardboard between layers of stacked batteries to avoid damage and short circuits.
- Do not allow conductive material to touch the battery terminals. A dangerous short-circuit may occur and cause battery failure and fire.

OTHER PRECAUTIONS (e.g.; Incompatibilities):

Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS/SYSTEM DESIGN INFORMATION:

Charge in areas with adequate ventilation.

VENTILATION:

General dilution ventilation is acceptable.

RESPIRATORY PROTECTION:

Not required for normal conditions of use. See also special firefighting procedures (Section 5).

EYE PROTECTION:

Wear protective glasses with side shields or goggles.

SKIN PROTECTION:

Wear chemical resistant gloves as a standard procedure to prevent skin contact.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries.

Wash Hands after handling.

EXPOSURE GUIDELINES & LIMITS:

OSHA Permissible Exposure Limit (PEL/TWA)

Lead, inorganic (as Pb)
Sulfuric acid

0.05 mg/m³
1.00 mg/m³

MATERIAL SAFETY DATA SHEET

LEAD ACID BATTERY WET, FILLED WITH ACID

(US, CN, EU Version for International Trade)

EXPOSURE GUIDELINES & LIMITS:

ACGIH	2007 Threshold Limit Value (TLV)	Antimony	0.50 mg/m ³	
		Arsenic	0.01 mg/m ³	
		Lead, inorganic (as Pb)	0.05 mg/m ³	
		Sulfuric acid	0.20 mg/m ³	
Quebec	Permissible Exposure Value (PEV)	Antimony	0.50 mg/m ³	
		Arsenic	0.01 mg/m ³	
		Lead, inorganic (as Pb)	0.15 mg/m ³	
		Sulfuric acid	1.00 mg/m ³	TWA
Ontario	Occupational Exposure Level (OEL)		3.00 mg/m ³	STEV
		Antimony	0.50 mg/m ³	
		Arsenic	0.10 mg/m ³	
		Lead (designated substance)	0.10 mg/m ³	
Netherlands	Maximaal Aanvaarde Concentratie (MAC)	Sulfuric acid	1.00 mg/m ³	TWAEV
			3.00 mg/m ³	STEV
		Antimony	0.50 mg/m ³	
		Arsenic (designated substance)	0.01 mg/m ³	
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)	Lead, inorganic (as Pb)	0.15 mg/m ³	
		Sulfuric acid	1.00 mg/m ³	
		Lead, inorganic (as Pb)	0.10 mg/m ³	
		Sulfuric acid	1.00 mg/m ³	TWA
United Kingdom	Occupational Exposure Standard (OES)		2.00 mg/m ³	STEL
		Antimony	0.50 mg/m ³	
		Lead	0.15 mg/m ³	
		Antimony	0.50 mg/m ³	
		Arsenic	0.10 mg/m ³	

TWA: 8-Hour Time-Weighted Average; STE: Short-Term Exposure; mg/m³: milligrams per cubic meter of air; NE: Not Established; STEV: Short-Term Exposure Value; TWAEV: Time-Weighted Average Exposure Value; STEL: Short-Term Exposure Limit

Additional Information

- Batteries are housed in polypropylene cases which are regulated as total dust or respirable dust only when they are ground up during recycling. The OSHA PEL for dust is 15 mg/m³ as total dust or 5 mg/m³ as respirable dust.
- May be required to meet Domestic Requirements for a Specific Destination(s).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Industrial/commercial lead acid battery
ODOUR:	Odourless
ODOUR THRESHOLD:	NA
PHYSICAL STATE:	Sulfuric Acid: Liquid; Lead: solid
pH:	<1
BOILING POINT:	235-240° F (113-116° C) (as sulfuric acid)
MELTING POINT:	NA
FREEZING POINT:	NA
VAPOUR PRESSURE:	10 mmHg
VAPOUR DENSITY (AIR = 1):	> 1
SPECIFIC GRAVITY (H₂O = 1):	1.27-1.33
EVAPORATION RATE (n-BuAc=1):	< 1
SOLUBILITY IN WATER:	100% (as sulfuric acid)
FLASH POINT:	Below room temperature (as hydrogen gas)
AUTO-IGNITION TEMPERATURE:	NA
LOWER EXPLOSIVE LIMIT (LEL):	4% (as hydrogen gas)
UPPER EXPLOSIVE LIMIT (UEL):	74% (as hydrogen gas)
PARTITION COEFFICIENT:	NA
VISCOSITY (poise @ 25° C):	Not Available

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

DECOMPOSITION TEMPERATURE: Not Available

FLAMMABILITY/HMIS HAZARD CLASSIFICATIONS (US/CN/EU): As sulfuric acid

HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 2

SECTION 10: STABILITY AND REACTIVITY

STABILITY: INCOMPATIBILITY (MATERIAL TO AVOID): HAZARDOUS DECOMPOSITION BY-PRODUCTS: HAZARDOUS POLYMERIZATION: CONDITIONS TO AVOID:	<p>This product is stable under normal conditions at ambient temperature.</p> <p>Strong bases, combustible organic materials, reducing agents, finely divided metals, strong oxidizers, and water.</p> <p>Thermal decomposition will produce sulfur dioxide, sulfur trioxide, carbon monoxide, sulfuric acid mist, and hydrogen.</p> <p>Will not occur</p> <p>Overcharging, sources of ignition</p>
--	---

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Test Results Basis and Comments):

Sulfuric acid: LD50, Rat: 2140 mg/kg
 LC50, Guinea pig: 510 mg/m³
Lead: No data available for elemental lead

SUBCHRONIC/CHRONIC TOXICITY (Test Results and Comments):

Repeated exposure to lead and lead compounds in the workplace may result in nervous system toxicity. Some toxicologists report abnormal conduction velocities in persons with blood lead levels of 50 µg/100 ml or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.

Additional Information

- Very little chronic toxicity data available for elemental lead.
- Lead is listed by IARC as a 2B carcinogen: possible carcinogen in humans. Arsenic is listed by IARC, ACGIH, and NTP as a carcinogen, based on studies with high doses over long periods of time. The other ingredients in this product, present at equal to or greater than 0,1% of the product, are not listed by OSHA, NTP, or IARC as suspect carcinogens.
- The 19th Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction. Risk phrase 61: May cause harm to the unborn child, applies to lead compounds, especially soluble forms.

SECTION 12: ECOLOGICAL INFORMATION

PERSISTENCE & DEGRADABILITY:

Lead is very persistent in soils and sediments. No data available on biodegradation.

BIOACCUMULATIVE POTENTIAL (Including Mobility):

Mobility of metallic lead between ecological compartments is low. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but very little bioaccumulation occurs through the food chain. Most studies have included lead compounds, not solid inorganic lead.

AQUATIC TOXICITY (Test Results & Comments):

Sulfuric acid: 24-hour LC50, fresh water fish (*Brachydanio rerio*): 82 mg/l
 96-hour LOEC, fresh water fish (*Cyprinus carpio*): 22 mg/l (lowest observable effect concentration)
Lead (metal): No data available

Additional Information

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: 0% (by Volume)
- Water Endangering Class (WGK): NA

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:

Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

HAZARDOUS WASTE

CLASS/CODE:

US - Not applicable to finished product as manufactured for distribution into commerce.
CN – Not applicable to finished product as manufactured for distribution into commerce.
EWC – Not applicable to finished product as manufactured for distribution into commerce.

Additional Information

Not Included – **Recycle** or dispose as allowed by local jurisdiction for the end-of-life characteristics as-disposed.

SECTION 14: TRANSPORT INFORMATION

GROUND – US-DOT/CAN-TDG/EU-ADR/APEC-ADR:

Proper Shipping Name	Batteries, Wet, Filled with Acid	ID Number	UN2794
Hazard Class	8	Labels	Corrosive
Packing Group	III		

AIRCRAFT – ICAO-IATA:

Proper Shipping Name	Batteries, Wet, Filled with Acid	ID Number	UN2794
Hazard Class	8	Labels	Corrosive
Packing Group	III		

Reference IATA packing instructions 870

VESSEL – IMO-IMDG:

Proper Shipping Name	Batteries, Wet, Filled with Acid	ID Number	UN2794
Hazard Class	8	Labels	Corrosive
Packing Group	III		

Reference IMDG packing instructions P801

Additional Information

Transport requires proper packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped.

SECTION 15: REGULATORY INFORMATION

INVENTORY STATUS:

All components are listed on the TSCA; EINECS/ELINCS; and DSL, unless noted otherwise below.

U.S. FEDERAL REGULATIONS:

TSCA Section 8b – Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b – Export Notification: If the finished product contains chemicals subject to TSCA Section 12b export notification, they are listed below:

<u>Chemical</u>	<u>CAS #</u>
None	NA

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT)

Chemicals present in the product which could require reporting under the statute:

<u>Chemical</u>	<u>CAS #</u>
Lead	7439-92-1
Sulfuric acid	7664-93-9

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

The finished product contains chemicals subject to the reporting requirements of Section 313 of SARA Title III.

<u>Chemical</u>	<u>CAS #</u>	<u>% wt</u>
Lead	7439-92-1	65
Sulfuric acid	7664-93-9	25

CERCLA SECTION 311/312 HAZARD CATEGORIES: Note that the finished product is exempt from these regulations, but lead and sulfuric acid above the thresholds are reportable on Tier II reports.

Fire Hazard	No
Pressure Hazard	No
Reactivity Hazard	No
Immediate Hazard	Yes (Sulfuric acid is Corrosive)
Delayed Hazard	No

Note: Sulfuric acid is
Hazardous

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

listed as an Extremely
Substance.

STATE REGULATIONS (US):

California Proposition 65

The following chemicals identified to exist in the finished product as distributed into commerce are known to the State of California to cause cancer, birth defects, or other reproductive harm:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
Arsenic (as arsenic oxides)	7440-38-2	<0.1
Strong inorganic acid mists including sulfuric acid	NA	25
Lead	7439-92-1	65

California Consumer Product Volatile Organic Compound Emissions

This Product is not regulated as a Consumer Product for purposes of CARB/OTC VOC Regulations, as-sold for the intended purpose and into the industrial/Commercial supply chain.

INTERNATIONAL REGULATIONS (Non-US):

Canadian Domestic Substance List (DSL)

All ingredients remaining in the finished product as distributed into commerce are included on the Domestic Substances List.

WHMIS Classifications

Class E: Corrosive materials present at greater than 1%

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 Controlled Products Regulations.

NPRI and Ontario Regulation 127/01

This product contains the following chemicals subject to the reporting requirements of Canada NPRI +/-or Ont. Reg. 127/01:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
Lead	7439-92-1	65
Sulfuric acid	7664-93-9	25

European Inventory of Existing Commercial Chemical Substances (EINECS)

All ingredients remaining in the finished product as distributed into commerce are exempt from, or included on, the European Inventory of Existing Commercial Chemical Substances.

European Communities (EC) Hazard Classification according to directives 67/548/EEC and 1999/45/EC.

<u>R-Phrases</u>	<u>S-Phrases</u>
35, 36, 38	1/2, 26, 30, 45

Additional Information

This product may be subject to Restriction of Hazardous Substances (RoHS) regulations in Europe and China, or may be regulated under additional regulations and laws not identified above, such as for uses other than described or as-designed/as-intended by the manufacturer, or for distribution into specific domestic destinations.

SECTION 16: OTHER INFORMATION

OTHER INFORMATION:

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

Sources of Information:

International Agency for Research on Cancer (1987), *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Overall Evaluations of Carcinogenicity: An updating of IARC Monographs Volumes 1-42, Supplement 7, Lyon, France.*

Ontario Ministry of Labour Regulation 654/86. Regulations Respecting Exposure to Chemical or Biological Agents.

RTECS – Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health.

MSDS/SDS PREPARATION INFORMATION:

DATE OF ISSUE: **30 April 2013**

SUPERCEDES: **16 December 2011**

DISCLAIMER:

This Material Safety Data Sheet is based upon information and sources available at the time of preparation or revision date. The information in the MSDS was obtained from sources which we believe are reliable, but are beyond our direct supervision or control. We make no Warranty of Merchantability, Fitness for any particular purpose or any other Warranty, Expressed or Implied, with respect to such information and we assume no liability resulting from its use. For this and other reasons, we do

MATERIAL SAFETY DATA SHEET
LEAD ACID BATTERY WET, FILLED WITH
ACID
(US, CN, EU Version for International Trade)

not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. It is the obligation of each user of this product to determine the suitability of this product and comply with the requirements of all applicable laws regarding use and disposal of this product. For additional information concerning East Penn Manufacturing Co., Inc. products or questions concerning the content of this MSDS please contact your East Penn representative.

END

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Butane	Trade Name: Butane
Product Use: Many	
Chemical Name: n-Butane	Synonym: Methylethylmethane, Diethyl, n-Butane, Butyl hydride.
Chemical Formula: C ₄ H ₁₀	Chemical Family: Alkanes
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Hazards Identification

Emergency Overview

DANGER! Flammable liquid and gas under pressure. Can form explosive mixtures with air. May cause frostbite. Can cause rapid suffocation. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. Odour: Faintly disagreeable above 5000ppm.

ROUTES OF EXPOSURE: Inhalation. Skin contact. Swallowing. Eye contact.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

- INHALATION:** Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headaches, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.
- SKIN CONTACT:** Liquid may cause frostbite.
- SKIN ABSORPTION:** No harm expected.
- SWALLOWING:** This product is a gas at normal temperature and pressure, but frostbite of the lips and mouth may result from contact with the liquid.
- EYE CONTACT:** Relatively non-irritating, but may cause frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

Repeated or prolonged exposure may cause dermatitis.

OTHER EFFECTS OF OVEREXPOSURE:

None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

The skin irritating properties of the material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

None.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

3. Composition and Information on Ingredients

COMPONENTS	CAS NUMBER	CONCENTRATION % by Mole
Butane	106-97-8	100

4. First Aid Measures**INHALATION:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

This material may be a cardiac sensitizer; avoid the use of epinephrine. There is no specific antidote, and treatment of overexposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE : Yes.	IF YES, UNDER WHAT CONDITIONS?	See Unusual Fire and Explosion Hazards.
-------------------------	---------------------------------------	---

EXTINGUISHING MEDIA:

CO₂, dry chemical, water spray or fog.

PRODUCTS OF COMBUSTION:

These products are carbon oxides (CO, CO₂).

PROTECTION OF FIREFIGHTERS:

DANGER! Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance taking care not to extinguish flames. Remove ignition source if without risk. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Reapproach with extreme caution. Use self-contained breathing apparatus. Stop flow of gas if without risk while continuing cooling water spray. Remove all containers from area if without risk. Allow fire to burn out.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Flammable gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Vapours form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved device. No part of a container should be subjected to temperature higher than 52 C (approximately 125 F). Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible, ground all equipment before use.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: 1.8

UPPER: 8.5

FLASH POINT:

Closed cup: -60°C (-76°F). (Tag)

AUTOIGNITION TEMPERATURE:

405°C (761°F)

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**Personal Precautions:**

DANGER! **Flammable, high-pressure gas.** Forms explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce gas with fog or fine water spray. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Flammable gas may spread from leak. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Environmental Precautions:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable liquid and gas under pressure. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Butane	106-97-8	Not available.	658 g/m3	1000 ppm

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH): Not available.

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: An explosion-proof local exhaust system is acceptable. See SPECIAL.

MECHANICAL (General): See SPECIAL.

SPECIAL: Use only in a closed system.

OTHER: See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Neoprene gloves.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Gas. (Compressed Gas)	FREEZING POINT: -138.36°C (-217°F)	pH: Not applicable.
BOILING POINT: -0.51°C (31.1°F)	VAPOUR PRESSURE: Not applicable.	MOLECULAR WEIGHT: 58.124 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) 0.57 @ 20/4 C	SOLUBILITY IN WATER, Very slightly soluble in cold water.	
SPECIFIC GRAVITY: VAPOUR (air = 1) 2.11 g/ml	EVAPORATION RATE (Butyl Acetate=1): >1 compared with (Butyl Acetate=1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.00254 g/ml	% VOLATILES BY VOLUME: 100% (v/v)	ODOUR THRESHOLD: Not available.
APPEARANCE & ODOUR: Colourless. Odour: Disagreeable. (Slight.)		

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Elevated temperatures > 435 C.
INCOMPATIBILITY (materials to avoid):	Oxidizing agents. Nickel carbonyl and oxygen mixtures.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	None known.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

ACUTE DOSE EFFECTS: The welding process may generate hazardous fumes and gases. See Sections 2, 10, 15 and 16 for additional information.

STUDY RESULTS:

None known.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Butane

HAZARD CLASS: CLASS 2.1
Flammable Gas

IDENTIFICATION #: UN1011

PRODUCT REPORTABLE QUANTITY (PRQ):

Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.

SHIPPING LABEL(s): Flammable gas

PLACARD (When Required): Flammable gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS (Canada): Class A: Compressed gas.
Class B-1: Flammable gas.
This product is on the DSL list.

International Regulations:

EINECS: Not available.

DSCL (EEC): This product is not classified according to EU legislation.

International Lists: No products were found.

16. Other Information**MIXTURES:**

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:**HMIS RATINGS:**

HEALTH 0
FLAMMABILITY 4
PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-510
PIN-INDEXED YOKE: Not available.
ULTRA-HIGH-INTEGRITY CONNECTION: Not available.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

- AV-1 Safe Handling and Storage of Compressed Gas
- P-1 Safe Handling of Compressed Gases in Containers
- P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres
- SB-2 Oxygen-Deficient Atmospheres
- SB-8 Use of Oxy-Fuel Gas Welding and Cutting Apparatus
- V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
- V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
- Handbook of Compressed Gases, Fifth Edition

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

PREPARATION INFORMATION:

DATE: October 15, 2013
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Praxair and the Flowing Airstream design are trademarks of
Praxair Canada Inc.

Other trademarks used herein are trademarks or registered trademarks of their respective owners.



Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DIESEL FUEL

Synonyms : Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC). Marine Gas Oil

Product code : 101802, 100107, 100668, 100658, 100911, 100663, 100652, 100460, 100065, 101796, 101793, 101795, 101792, 101794, 101791, 100768, 100643, 100642, 100103, 101798, 101800, 101797, 101788, 101789, 101787, 102531, 100734, 100733, 100640, 100997, 100995, 100732, 100731, 100994

Manufacturer or supplier's details
Petro-Canada
P.O. Box 2844, 150 - 6th Avenue South-West
Calgary Alberta T2P 3E3
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Bright oily liquid.
Colour	Clear to yellow (This product may be dyed red for taxation purposes).
Odour	Mild petroleum oil like.
Hazard Summary	Combustible liquid. May cause cancer. Irritating to eyes and skin.

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Potential Health Effects

- Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact
Skin Absorption
- Target Organs : Skin
Eyes
Respiratory Tract
- Inhalation : May cause respiratory tract irritation.
Inhalation may cause central nervous system effects.
Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.
- Skin : Causes skin irritation.
- Eyes : Causes eye irritation.
- Ingestion : Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Aspiration hazard if swallowed - can enter lungs and cause damage.
- Aggravated Medical Condition : None known.

Carcinogenicity:

IARC

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
kerosine (petroleum), hydrodesulfurized	64742-81-0	70 - 100 %
kerosine (petroleum)	8008-20-6	
fuels, diesel	68334-30-5	
fuel oil no. 2	68476-30-2	
Alkanes, C10-20-branched and linear	928771-01-1	0 - 25 %
Soybean oil, Methyl ester	67784-80-9	0 - 5 %
Rape oil, Methyl ester	73891-99-3	

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Fatty acids, tallow, Methyl esters

61788-61-2

SECTION 4. FIRST AID MEASURES

- If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.
- In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.
- If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.
- Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Dry chemical
Carbon dioxide (CO₂)
Water fog.
Foam
- Unsuitable extinguishing media : Do NOT use water jet.
- Specific hazards during firefighting : Cool closed containers exposed to fire with water spray.
- Hazardous combustion products : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), sulphur compounds (H₂S), smoke and irritating vapours as products of incomplete combustion.
- Further information : Prevent fire extinguishing water from contaminating surface water or the ground water system.
- Special protective equipment : Wear self-contained breathing apparatus for firefighting if

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

for firefighters

necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Material can create slippery conditions.
- Environmental precautions : If the product contaminates rivers and lakes or drains inform respective authorities.
- Methods and materials for containment and cleaning up : Prevent further leakage or spillage if safe to do so.
Remove all sources of ignition.
Soak up with inert absorbent material.
Non-sparking tools should be used.
Ensure adequate ventilation.
Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use.
- Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum),	64742-81-0	TWA	200 mg/m3	ACGIH

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

hydrodesulfurized			(As total hydrocarbon vapour)	
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
kerosine (petroleum)	8008-20-6	TWA	200 mg/m3 (As total hydrocarbon vapour)	CA BC OEL

Engineering measures : Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : 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.

Hand protection
Material : neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R). 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.

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

the specific work-place.

- Protective measures : Wash contaminated clothing before re-use.
- Hygiene measures : Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Bright oily liquid.
- Colour : Clear to yellow (This product may be dyed red for taxation purposes).
- Odour : Mild petroleum oil like.
- Odour Threshold : No data available
- pH : No data available
- Pour point : No data available
- Boiling point/boiling range : 150 - 371 °C (302 - 700 °F)
- Flash point : > 40 °C (104 °F)
Method: closed cup
- Auto-Ignition Temperature : 225 °C (437 °F)
- Evaporation rate : No data available
- Flammability : 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.
- Upper explosion limit : 6 %(V)
- Lower explosion limit : 0.7 %(V)
- Vapour pressure : 7.5 mmHg (20 °C / 68 °F)
- Relative vapour density : 4.5
- Relative density : 0.8 - 0.88
- Solubility(ies)
- Water solubility : insoluble
- Partition coefficient: n-octanol/water : No data available
- Viscosity
- Viscosity, kinematic : 1.3 - 4.1 cSt (40 °C / 104 °F)

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Explosive properties : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions : Hazardous polymerisation does not occur. Stable under normal conditions.

Conditions to avoid : Extremes of temperature and direct sunlight.

Incompatible materials : Reactive with oxidising agents and acids.

Hazardous decomposition products : May release CO_x, NO_x, SO_x, H₂S, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Eye contact
Ingestion
Inhalation
Skin contact
Skin Absorption

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Components:

kerosine (petroleum), hydrodesulfurized:

Acute oral toxicity : LD50 Rat: > 5,000 mg/kg,

Acute inhalation toxicity : LC50 Rat: > 5.2 mg/l
Exposure time: 4 hrs
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 Rabbit: > 2,000 mg/kg,

kerosine (petroleum):

Acute oral toxicity : LD50 Rat: > 5,000 mg/kg,

Acute inhalation toxicity : LC50 Rat: > 5 mg/l

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 Rabbit: > 2,000 mg/kg,

fuels, diesel:

Acute oral toxicity : LD50 Rat: 7,500 mg/kg,

Acute dermal toxicity : LD50 Mouse: 24,500 mg/kg,

fuel oil no. 2:

Acute oral toxicity : LD50 Rat: 12,000 mg/kg,

Acute inhalation toxicity : LC50 Rat: 4.1 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No. : 1202

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Proper shipping name : Diesel fuel
Class : 3
Packing group : III
Labels : 3
Packing instruction (cargo aircraft) : 366

IMDG-Code

UN number : 1202
Proper shipping name : DIESEL FUEL
Class : 3
Packing group : III
Labels : 3
EmS Code : F-E, S-E
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

TDG

UN number : 1202
Proper shipping name : DIESEL FUEL
Class : 3
Packing group : III
Labels : 3
ERG Code : 128
Marine pollutant : no

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : B3: Combustible Liquid
D2A: Very Toxic Material Causing Other Toxic Effects
D2B: Toxic Material Causing Other Toxic Effects

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL : On the inventory, or in compliance with the inventory
TSCA : All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS : On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-

Material Safety Data Sheet

DIESEL FUEL

000003000395



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

1228

For Product Safety Information: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493

Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PRODURO^{TM/MC} TO-4⁺ 10W

Product code : PD410WP5R, PD410WP20, PD410WICT, PD410WIBC,
PD410WDRR, PD410WDRM, PD410WDCT, PD410W,
PD410WBLK

Manufacturer or supplier's details
Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga ON L5J 1K2
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for
emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : Multipurpose transmission, hydraulic, wet brake and final drive
fluids intended for use where Caterpillar TO-4 quality oils are
recommended.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	Light amber.
Odour	Hydrocarbon.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Aggravated Medical Condition : None known.

Carcinogenicity:

IARC

No component of this product present at levels greater than or
equal to 0.1% is identified as probable, possible or confirmed
human carcinogen by IARC.

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

ACGIH

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

No hazardous ingredients

SECTION 4. FIRST AID MEASURES

- If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.
- In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.
- If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.
- Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : No information available.

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W



000003000493

Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

- | | |
|--------------------------------------|--|
| Specific hazards during firefighting | : Cool closed containers exposed to fire with water spray. |
| Hazardous combustion products | : Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), phosphorus oxides (PO _x), calcium oxides (CaO _x), zinc oxides (ZnO _x), aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion. |
| Further information | : Prevent fire extinguishing water from contaminating surface water or the ground water system. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Material can create slippery conditions. |
| Environmental precautions | : Do not allow uncontrolled discharge of product into the environment. |
| Methods and materials for containment and cleaning up | : Prevent further leakage or spillage if safe to do so.
Remove all sources of ignition.
Soak up with inert absorbent material.
Non-sparking tools should be used.
Ensure adequate ventilation.
Contact the proper local authorities. |

SECTION 7. HANDLING AND STORAGE

- | | |
|-----------------------------|---|
| Advice on safe handling | : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use. |
| Conditions for safe storage | : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight. |

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : organic vapour filter

Hand protection
Material : neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R).

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures : Wash contaminated clothing before re-use.
No special protective equipment required.

Hygiene measures : Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : viscous liquid

Colour : Light amber.

Odour : Hydrocarbon.

Odour Threshold : No data available

pH : No data available

Pour point : -33 °C (-27 °F)

Boiling point/boiling range : No data available

Flash point : 239 °C (462 °F)

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

Method: Cleveland open cup

Fire Point	: No data available
Auto-Ignition Temperature	: No data available
Evaporation rate	: No data available
Flammability	: Low fire hazard. This material must be heated before ignition will occur.
Upper explosion limit	: No data available
Lower explosion limit	: No data available
Vapour pressure	: No data available
Relative vapour density	: No data available
Density	: 0.856 kg/l (15 °C / 59 °F)
Solubility(ies)	
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Viscosity, kinematic	: 35.38 cSt (40 °C / 104 °F)
	6.28 cSt (100 °C / 212 °F)
Explosive properties	: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	: No data available
Incompatible materials	: Reactive with acids, alkalis and oxidising agents.
Hazardous decomposition products	: May release CO _x , SO _x , NO _x , H ₂ S, PO _x , ZnO _x , CaO _x , asphyxiants, methacrylate monomers, aldehydes, alkyl mercaptans, sulfides, metal oxides, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Eye contact Ingestion Inhalation
--	--

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

Skin contact

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

49 CFR

Not regulated as a dangerous good

TDG

Not regulated as a dangerous good

Special precautions for user

Material Safety Data Sheet

PRODURO^{TM/MC} TO-4⁺ 10W

000003000493



Version 3.0

Revision Date 2015/02/17

Print Date 2015/02/17

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : Not Rated

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
IECSC	On the inventory, or in compliance with the inventory
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Material Safety Data Sheet

SUPREME™ 15W-40 4-STROKE MOTORCYCLE OIL



1. Product and company identification

Product name	: SUPREME™ 15W-40 4-STROKE MOTORCYCLE OIL
Code	: SP4T15
Material uses	: A 4-cycle gasoline motor cycle engine oil for use in Motorcycles, mopeds, lawn mowers, generators, lawn maintenance equipment, chain saws, agriculture equipment, Snowmobiles, pleasure outboard marine, ATV and PWC that require an API SN and JASO MA level of performance.
Manufacturer	: Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga, Ontario Canada L5J 1K2
<u>In case of emergency</u>	: Suncor Energy: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Hazards identification

Physical state	: Viscous liquid.
Odour	: Mild petroleum oil like.
WHMIS (Canada)	: Not controlled under WHMIS (Canada).
OSHA/HCS status	: While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
Emergency overview	: No specific hazard.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.
Skin	: Slightly irritating to the skin.
Eyes	: Slightly irritating to the eyes.
<u>Potential chronic health effects</u>	
Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: Not listed as carcinogenic by OSHA, NTP or IARC.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Medical conditions aggravated by over-exposure	: Repeated skin exposure can produce local skin destruction or dermatitis. Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation.

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	Mixture.	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

3 . Composition/information on ingredients

The base oil may be a mixture of the following CAS#s: 8042-47-5, 64742-46-7, 64742-47-8, 64742-53-6, 64742-54-7, 64742-55-8, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0, 178603-65-1, 178603-66-2, 445411-73-4

4 . First-aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

- Flammability of the product** : May be combustible at high temperature.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Products of combustion** : Carbon oxides (CO, CO₂), sulphur oxides (SO_x), calcium oxides (CaO_x), aldehydes, smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Low fire hazard. This material must be heated before ignition will occur.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

6 . Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	ACGIH TLV (United States). Notes: (Mineral oil) TWA: 5 mg/m ³ , (Inhalable fraction) 8 hour(s).

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton®.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

8 . Exposure controls/personal protection

- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

- Physical state** : Viscous liquid.
- Flash point** : Open cup: 235°C (455°F) [(ASTM D92, Cleveland.)]
- Auto-ignition temperature** : Fire Point: 239 °C (462.2°F)
- Flammable limits** : Not available.
- Colour** : Light amber.
- Odour** : Mild petroleum oil like.
- Odour threshold** : Not available.
- pH** : Not available.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : Not available.
- Relative density** : 0.8727 kg/L @ 15°C (59°F)
- Vapour pressure** : Not available.
- Vapour density** : Not available.
- Volatility** : Not available.
- Evaporation rate** : Not available.
- Viscosity** : 118.2 cSt @ 40°C (104°F), 15.6 cSt @ 100°C (212°F), VI=139
- Pour point** : -42°C (-44°F)
- Solubility** : Insoluble in water.

10 . Stability and reactivity

- Chemical stability** : The product is stable.
- Hazardous polymerisation** : Under normal conditions of storage and use, hazardous polymerisation will not occur.
- Materials to avoid** : Reactive with oxidising agents, acids, halogens and halogenated compounds.
- Hazardous decomposition products** : May release CO_x, H₂S, aldehydes, alkyl mercaptans, sulfides, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation	Rat	>5.2 mg/l	4 hours
	Dusts and mists			

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

11 . Toxicological information

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name

Mixture of severely hydrotreated and hydrocracked base oil (petroleum).

ACGIH

A4

IARC

-

EPA

-

NIOSH

-

NTP

-

OSHA

-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

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

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : At least one component is not listed in EINECS but all such components are listed in ELINCS.
Please contact your supplier for information on the inventory status of this material.

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	1
Flammability	1
Physical hazards	0
Personal protection	B

National Fire Protection Association (U.S.A.) :



References

: Available upon request.
™ Trademark of Suncor Energy Inc. Used under licence.

Date of printing : 1/10/2012.

Date of issue : 10 January 2012

Date of previous issue : 1/10/2012.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS

: 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: lubricants.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518

Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285

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

16 . Other information

For Product Safety Information: (905) 804-4752

Notice to reader

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

SNOWMOBILE MOTOR OIL



1. Product and company identification

Product name	: SNOWMOBILE MOTOR OIL
Code	: PSNOL
Material uses	: Low ash engine oil specifically designed to lubricate two-cycle snowmobile engines.
Manufacturer	: Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga, Ontario Canada L5J 1K2
<u>In case of emergency</u>	: Suncor Energy: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Hazards identification

Physical state	: Viscous liquid.
Odour	: Mild petroleum oil like.
WHMIS (Canada)	: Not controlled under WHMIS (Canada).
OSHA/HCS status	: While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
Emergency overview	: No specific hazard.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.
Skin	: Slightly irritating to the skin.
Eyes	: Slightly irritating to the eyes.
<u>Potential chronic health effects</u>	
Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: Not listed as carcinogenic by OSHA, NTP or IARC.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Medical conditions aggravated by over-exposure	: Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	Mixture	-

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

The base oil may be a mixture of the following CAS#s: 8042-47-5, 64741-95-3, 64742-01-4, 64742-46-7, 64742-47-8, 64742-53-6, 64742-54-7, 64742-55-8, 64742-62-7, 72623-83-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0, 178603-65-1, 178603-66-2, 445411-73-4

3 . Composition/information on ingredients

4 . First-aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

- Flammability of the product** : May be combustible at high temperature.
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Products of combustion** : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), acrid fumes, smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Low fire hazard. This material must be heated before ignition will occur.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

6 . Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	ACGIH TLV (United States). Notes: (Mineral oil) TWA: 5 mg/m ³ , (Inhalable fraction) 8 hour(s).

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
- Engineering measures** : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton®.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

8 . Exposure controls/personal protection

- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

- Physical state** : Viscous liquid.
- Flash point** : Open cup: 152°C (305.6°F) [Cleveland.]
- Auto-ignition temperature** : Not available.
- Flammable limits** : Not available.
- Colour** : Blue-green.
- Odour** : Mild petroleum oil like.
- Odour threshold** : Not available.
- pH** : Not available.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : Not available.
- Relative density** : 0.88 kg/L @ 15°C (59°F)
- Vapour pressure** : Not available.
- Vapour density** : Not available.
- Volatility** : Not available.
- Evaporation rate** : Not available.
- Viscosity** : 20.9 cSt @ 40°C (104°F), 4.5 cSt @ 100°C (212°F), VI=132
- Pour point** : -57°C (-71°F)
- Solubility** : Insoluble in water.

10 . Stability and reactivity

- Chemical stability** : The product is stable.
- Hazardous polymerisation** : Under normal conditions of storage and use, hazardous polymerisation will not occur.
- Materials to avoid** : Reactive with oxidising agents, reducing agents, alkalis and acids.
- Hazardous decomposition products** : May release CO_x, NO_x, SO_x, aldehydes, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation	Rat	>5.2 mg/l	4 hours
	Dusts and mists			

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

11 . Toxicological information

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

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

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	1
Flammability	1
Physical hazards	0
Personal protection	B

National Fire Protection Association (U.S.A.) :



References

: Available upon request.
TM Trademark of Suncor Energy Inc. Used under licence.

Date of printing : **1/19/2012.**

Date of issue : 19 January 2012

Date of previous issue : 10/7/2010.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS

: 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: lubricants.petro-canada.ca/msds

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518

Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285

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

16 . Other information

For Product Safety Information: (905) 804-4752

Notice to reader

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



PETRO-CANADA ANTIFREEZE



1. Product and company identification

Product name	: PETRO-CANADA ANTIFREEZE
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.
Code	: W269
Material uses	: Used as an engine antifreeze coolant.
Manufacturer	: PETRO-CANADA P.O. Box 2844 150 – 6th Avenue South-West Calgary, Alberta T2P 3E3
<u>In case of emergency</u>	: Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Hazards identification

Physical state	: Clear viscous liquid.
Odour	: Odourless.
WHMIS (Canada)	:   Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic).
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: WARNING! HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA. Harmful by inhalation and if swallowed. Slightly irritating to the eyes and skin. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that may cause target organ damage, based on animal data. Contains material which may cause birth defects, based on animal data. Contains material which may cause developmental abnormalities, based on animal data. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: Harmful by inhalation. Inhalation of dust may produce irritation of the respiratory tract.
Ingestion	: Toxic if swallowed. 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.
Skin	: Slightly irritating to the skin.
Eyes	: Slightly irritating to the eyes.
<u>Potential chronic health effects</u>	
Chronic effects	: Contains material that may cause target organ damage, based on animal data.

2 . Hazards identification

Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: Contains material which may cause birth defects, based on animal data.
Developmental effects	: Contains material which may cause developmental abnormalities, based on animal data.
Fertility effects	: No known significant effects or critical hazards.
Target organs	: 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.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Ethylene glycol	107-21-1	90 - 99

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
Ingestion	: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
Notes to physician	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product	: May be combustible at high temperature.
<u>Extinguishing media</u>	
Suitable	: Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: None known.
Special exposure hazards	: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

5 . Fire-fighting measures

- Products of combustion** : Carbon oxides (CO, CO₂), smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Ethylene glycol	ACGIH TLV (United States). CEIL: 100 mg/m ³ , (aerosol)

Consult local authorities for acceptable exposure limits.

8 . Exposure controls/personal protection

Recommended monitoring procedures	: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
Engineering measures	: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
Hygiene measures	: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
<u>Personal protection</u>	
Respiratory	: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter
Hands	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: nitrile rubber. 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.
Eyes	: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Skin	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Clear viscous liquid.
Flash point	: Closed cup: 116°C (240.8°F) [Tagliabue.] Open cup: 115.6°C (240.1°F) [Cleveland.]
Auto-ignition temperature	: Not available.
Flammable limits	: Lower: 3.2% Upper: 15.3%
Colour	: Green.
Odour	: Odourless.
Odour threshold	: Not available.
pH	: 7
Boiling/condensation point	: 197°C (386.6°F)
Melting/freezing point	: -13°C (8.6°F)
Relative density	: 1.12 to 1.15
Vapour pressure	: 0.008 kPa (0.06 mm Hg) [20°C]
Vapour density	: 2.1 [Air = 1]
Volatility	: Not available.

9 . Physical and chemical properties

Evaporation rate	: 0.01 (butyl acetate = 1)
Viscosity	: Not available.
Pour point	: Not available.
Solubility	: Soluble in water, methanol and diethyl ether.

10 . Stability and reactivity

Chemical stability	: The product is stable.
Hazardous polymerisation	: Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	: Reactive with oxidising agents, acids and alkalis.
Hazardous decomposition products	: May release COx, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ethylene glycol	LD50 Dermal	Rabbit	9530 mg/kg	-
	LD50 Oral	Rat	4700 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	2725 mg/m ³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Ethylene glycol	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.


13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Ethylene glycol based coolant)	9	III		Special provisions In single containers of 5000 lbs capacity or less this product is exempt from DOT regulations (not regulated).

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Toxic material
Target organ effects

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).

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

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : Not determined.

16 . Other information

Label requirements : HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		1
Physical hazards		0
Personal protection		B

National Fire Protection Association (U.S.A.) :



References

: Available upon request.
™ Trademark of Suncor Energy Inc. Used under licence.

Date of printing

: 3/25/2013.

Date of issue

: 7 March 2013

Date of previous issue

: 3/7/2013.

Responsible name

: **Product Safety - DSR**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS

: 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

Notice to reader

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

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : GASOLINE, UNLEADED

Synonyms : Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, TQRUL, transitional quality regular unleaded, BOB, Blendstock for Oxygenate Blending, Conventional Gasoline, RUL, MUL, SUL, PUL.

Product code : 100126, 101823, 100507, 101811, 101814, 100141, 101813, 101810, 101812, 100063, 101822, 100138, 101821, 100064, 101820, 101819, 100506, 101818, 101816, 101817, 100488

Manufacturer or supplier's details
Petro-Canada
P.O. Box 2844, 150 - 6th Avenue South-West
Calgary Alberta T2P 3E3
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : 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.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Clear liquid.
Colour	Clear to slightly yellow or green, undyed liquid. May be dyed red for taxation purposes.
Odour	Gasoline
Hazard Summary	Flammable liquid Irritating to eyes and skin. May cause cancer. May cause heritable genetic damage.

Potential Health Effects

Primary Routes of Entry : Eye contact

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

	Ingestion Inhalation Skin contact	
Target Organs	: Blood Immune system	
Inhalation	: Inhalation may cause central nervous system effects. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.	
Skin	: May irritate skin.	
Eyes	: May irritate eyes.	
Ingestion	: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Aspiration hazard if swallowed - can enter lungs and cause damage.	
Chronic Exposure	: Chronic exposure to benzene may result in increased risk of leukemia and other blood disorders.	
Aggravated Medical Condition	: None known.	
Carcinogenicity:		
IARC	Group 1: Carcinogenic to humans	
	Benzene	71-43-2
ACGIH	Confirmed human carcinogen	
	Benzene	71-43-2
	Confirmed animal carcinogen with unknown relevance to humans	
	Ethanol	64-17-5
	Gasoline, natural	8006-61-9

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
---------------	---------	-------------------

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

gasoline	86290-81-5	95 - 100 %
toluene	108-88-3	1 - 40 %
benzene	71-43-2	0.5 - 1.5 %
ethanol	64-17-5	0.1 - 0.3 %

SECTION 4. FIRST AID MEASURES

- If inhaled : Artificial respiration and/or oxygen may be necessary.
Move to fresh air.
Seek medical advice.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.
- In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.
- If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.
- Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Dry chemical
Carbon dioxide (CO₂)
Water fog.
Foam
- Unsuitable extinguishing media : Do NOT use water jet.
- Specific hazards during firefighting : Cool closed containers exposed to fire with water spray.
- Hazardous combustion products : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Further information : Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Material can create slippery conditions.

Environmental precautions : If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up : Prevent further leakage or spillage if safe to do so.
Remove all sources of ignition.
Soak up with inert absorbent material.
Non-sparking tools should be used.
Ensure adequate ventilation.
Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use.

Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

gasoline	86290-81-5	TWA	300 ppm	CA AB OEL
		STEL	500 ppm	CA AB OEL
		TWA	300 ppm	CA BC OEL
		STEL	500 ppm	CA BC OEL
		TWA	300 ppm	ACGIH
		STEL	500 ppm	ACGIH
toluene	108-88-3	TWA	50 ppm 188 mg/m3	CA AB OEL
		TWA	20 ppm	CA BC OEL
		TWAEV	50 ppm 188 mg/m3	CA QC OEL
		TWA	20 ppm	ACGIH
benzene	71-43-2	TWA	0.5 ppm 1.6 mg/m3	CA AB OEL
		STEL	2.5 ppm 8 mg/m3	CA AB OEL
		TWA	0.5 ppm	CA BC OEL
		STEL	2.5 ppm	CA BC OEL
		TWA	0.5 ppm	CA ON OEL
		STEL	2.5 ppm	CA ON OEL
		TWAEV	1 ppm 3 mg/m3	CA QC OEL
		STEV	5 ppm 15.5 mg/m3	CA QC OEL
		TWA	0.5 ppm	ACGIH
		STEL	2.5 ppm	ACGIH
ethanol	64-17-5	TWA	1,000 ppm 1,880 mg/m3	CA AB OEL
		STEL	1,000 ppm	CA BC OEL
		TWAEV	1,000 ppm 1,880 mg/m3	CA QC OEL
		STEL	1,000 ppm	ACGIH

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Toluene	108-88-3	Toluene	In blood	Prior to last shift of workweek	0.02 mg/l	ACGIH BEI
		Toluene	Urine	End of shift (As soon as possible after exposure ceases)	0.03 mg/l	ACGIH BEI

Engineering measures

: Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : 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.

Hand protection
Material : polyvinyl alcohol (PVA), Viton(R). 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.

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures : Wash contaminated clothing before re-use.

Hygiene measures : Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Clear liquid.

Colour : Clear to slightly yellow or green, undyed liquid. May be dyed red for taxation purposes.

Odour : Gasoline

Odour Threshold : No data available

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

pH	: No data available
Pour point	: No data available
Boiling point/boiling range	: 25 - 225 °C (77 - 437 °F)
Flash point	: -50 - -38 °C (-58 - -36 °F) Method: Tagliabue.
Auto-Ignition Temperature	: 257 °C (495 °F)
Evaporation rate	: No data available
Flammability	: Extremely flammable in presence of open flames, sparks, shocks, 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.
Upper explosion limit	: 7.6 %(V)
Lower explosion limit	: 1.3 %(V)
Vapour pressure	: < 802.5 mmHg (20 °C / 68 °F)
Relative vapour density	: 3
Relative density	: 0.685 - 0.8
Solubility(ies)	
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Explosive properties	: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	: Extremes of temperature and direct sunlight.
Incompatible materials	: Reactive with oxidising agents, acids and interhalogens.
Hazardous decomposition products	: May release CO _x , NO _x , phenols, polycyclic aromatic hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.



SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Eye contact
Ingestion
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Components:

gasoline:

Acute oral toxicity : LD50 Rat: 13,600 mg/kg,

Acute dermal toxicity : LD50 Rabbit: > 5,000 mg/kg,

toluene:

Acute oral toxicity : LD50 Rat: 5,580 mg/kg,

Acute inhalation toxicity : LC50 Rat: 7585 ppm
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 Rabbit: 12,125 mg/kg,

benzene:

Acute oral toxicity : LD50 Rat: 2,990 mg/kg,

Acute inhalation toxicity : LC50 Rat: 13700 ppm
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 Rabbit: > 8,240 mg/kg,

ethanol:

Acute oral toxicity : LD50 Rat: 7,060 mg/kg,

Acute inhalation toxicity : LC50 Rat: > 32380 ppm
Exposure time: 4 h
Test atmosphere: vapour

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Skin corrosion/irritation

Product:

Remarks: No data available

Components:

gasoline:

Result: Moderate skin irritant

toluene:

Result: Moderate skin irritant

benzene:

Result: Moderate skin irritant

ethanol:

Result: Skin irritation

Serious eye damage/eye irritation

Product:

Remarks: No data available

Components:

gasoline:

Result: Mild eye irritation

toluene:

Result: Mild eye irritation

benzene:

Result: Moderate eye irritation

ethanol:

Result: Eye irritation

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No. : 1203
Proper shipping name : Gasoline
Class : 3
Packing group : II
Labels : 3
Packing instruction (cargo aircraft) : 364

IMDG-Code

UN number : 1203
Proper shipping name : GASOLINE
Class : 3
Packing group : II
Labels : 3
EmS Code : F-E, S-E
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

TDG

UN number : 1203
Proper shipping name : GASOLINE
Class : 3
Packing group : II
Labels : 3
ERG Code : 128
Marine pollutant : no

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : B2: Flammable liquid
D2A: Very Toxic Material Causing Other Toxic Effects
D2B: Toxic Material Causing Other Toxic Effects

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL On the inventory, or in compliance with the inventory
TSCA All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

EINECS On the inventory, or in compliance with the inventory

Material Safety Data Sheet

GASOLINE, UNLEADED

000003000644



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

1 Identification of substance

- **Product details**
- **Trade name:** Helium (Compressed Gas)
- **Article number:** 033-01-0001
- **Creation date:** 08/14/2006
- **Manufacturer/Supplier:**

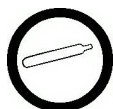
Linde Canada Limited	Linde
5860 Chedworth Way	575 Mountain Avenue
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974
Telephone (905) 501-1700	Telephone (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:	24-HOUR EMERGENCY TELEPHONE NUMBER
: (905) 501-0802	CHEMTREC (800) 424-9300 OR
	Linde National Operations Center (800) 232-4726
- Pse ensure that this MSDS is received by the appropriate person.
- **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

- **Chemical characterization:**
- **CAS No. Description**
7440-59-7 Helium
- **Identification number(s)**
- **EINECS Number:** 231-168-5

3 Hazards identification

- **Hazard description:**
- **WHMIS-symbols:**
A - Compressed gas



- **HMIS-ratings (scale 0 - 4)**

HEALTH	0	Health = 0
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

- **NFPA ratings (scale 0 - 4)**



- **Information pertaining to particular dangers for man and environment:** Not applicable.
- **Classification system:**
The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

(Contd. on page 2)

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 1)

GHS label elements

Warning

2.5/C - Contains gas under pressure; may explode if heated.

Storage:

Protect from sunlight. Store in a well-ventilated place.

4 First aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable

5 Fire fighting measures

- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.
- **Measures for cleaning/collecting:** Ensure adequate ventilation.
- **Additional information:** No dangerous substances are released.

7 Handling and storage

- **Handling:**
- **Information for safe handling:**
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.

(Contd. on page 3)

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 2)

· Further information about storage conditions:

Keep cylinder valve tightly closed.

Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

· Additional information about design of technical systems:

Adequate local ventilation.

Safety showers and eyewash stations should be nearby.

· Components with limit values that require monitoring at the workplace:
7440-59-7 Helium (60 - 100%)

EL Simple asphyxiant

· Additional information: The lists that were valid during the creation were used as basis.

· Personal protective equipment:
· General protective and hygienic measures:

Protective clothing and PPE should be kept free of oil and grease, generally in clean condition

PPE should be inspected and maintained regularly to retain effectiveness.

· Breathing equipment:

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

· Protection of hands:


Protective gloves.

· Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· Eye protection: Safety glasses

9 Physical and chemical properties

· General Information

Form:	Gaseous.
Color:	Colorless
Odor:	Odorless

· Change in condition
Melting point/Melting range: -272°C**Boiling point/Boiling range:** -268°C
· Flash point: Not applicable.

· Danger of explosion: Product does not present an explosion hazard.

· Solubility in / Miscibility with
Water at 20°C: 8.6 g/l

10 Stability and reactivity

· Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.

· Materials to be avoided:
· Dangerous reactions No dangerous reactions known.

(Contd. on page 4)

CDN

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 3)

- **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
- **LD/LC50 values that are relevant for classification:** LC50 - None available
- **Primary irritant effect:**
- **on the skin:** No irritating effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** None applicable.

14 Transport information

- **TDG and DOT regulations:**



- **Hazard class:** 2
- **Identification number:** UN1046
- **Proper shipping name (technical name):** HELIUM, COMPRESSED
- **Label:** 2.2

- **Maritime transport IMDG:**



- **IMDG Class:** 2.2
- **UN Number:** 1046
- **Label:** 2.2
- **Marine pollutant:** No

(Contd. on page 5)

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

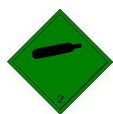
Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 4)

· Proper shipping name: HELIUM, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



· ICAO/IATA Class: 2

· UN/ID Number: 1046

· Label: 2.2

· Proper shipping name: HELIUM, COMPRESSED

· UN "Model Regulation": UN1046, HELIUM, COMPRESSED, 2.2

15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Cancerogenity categories

· EPA (Environmental Protection Agency)

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

· Canadian substance listings:

· Canadian Domestic Substances List (DSL)

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

(Contd. on page 6)

CDN

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 5)

· Canadian Ingredient Disclosure list (limit 1%)

Substance is not listed.

· Product related hazard informations:

Observe the general safety regulations when handling chemicals.

The substance is not subject to classification according to the sources of literature known to us.

The product was 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.

· Safety phrases:

Keep container tightly closed in a cool place.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· Department issuing MSDS: Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

EL: Exposure Limit per ACGIH TLV

EV: Permissible Exposure Limit per OSHA

N/A: Not Applicable

CDN

Material Safety Data Sheet



n-hexane

1. Product and company identification

Product name	: n-hexane
Synonym	: 1-hexane, n-Hexane, normal-hexane, hexyl hydride
Trade name	:
Material uses	: Other non-specified industry: SOLVENT, ESPECIALLY FOR VEGETABLE OILS; LOW TEMPERATURE THERMOMETERS; CALIBRATIONS; POLYMERIZATION REACTION MEDIUM; PAINT DILUENT; ALCOHOL DENATURANT.
Manufacturer	: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
MSDS #	: E-6228
Validation date	: March 24, 2015.
Print date	: March 24, 2015.
<u>In case of emergency</u>	: Emergencies: * 1-800-363-0042 *Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.
Product type	: Liquid.

2. Hazards identification

Physical state	: Liquid. [COLORLESS LIQUID WITH A MILD GASOLINE-LIKE ODOR]
Odor	: MILD, GASOLINE-LIKE [Slight]
Emergency overview	: DANGER! Flammable liquid and vapor. May form explosive mixtures with air. May irritate the eyes, skin, and respiratory tract. Has anesthetic effects in high concentrations. May cause nervous system damage. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. Under ambient conditions, this is colorless liquid. Extremely flammable liquid. Keep away from heat, sparks and flame. Avoid breathing vapor or mist. Avoid contact with skin and clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use.
Routes of entry	: Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: Vapors irritate the respiratory tract. High concentrations may act as an anesthetic, first stimulating the central nervous system (CNS), then depressing it to varying degrees. CNS depression is marked dizziness, drowsiness, and possibly unconsciousness.
Ingestion	: When children ingest petroleum distillates such as hexane, the effects are similar to those of inhalation: CNS depression and tissue irritation. Lung damage due primarily to inhalation of vomited material has lead to coma and death from pulmonary edema (fluid on the lungs).
Skin	: Liquid or vapour may irritate the skin. Harmful amounts may be absorbed through the skin
Eyes	: May cause eye irritation.
<u>Potential chronic health effects</u>	
Chronic effects	: Repeated or prolonged exposure of the skin may cause cracking and drying due to defatting of tissues. Chronic exposure may cause nervous system damage.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.

2. Hazards identification

- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : May cause damage to the following organs: peripheral nervous system, upper respiratory tract, skin, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

- Inhalation** : No specific data.
- Ingestion** : No specific data.
- Skin** : No specific data.
- Eyes** : No specific data.

- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3. Composition/information on ingredients

Canada

<u>Name</u>	<u>CAS number</u>	<u>%</u>
n-hexane	110-54-3	100

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Extremely flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

5. Fire-fighting measures

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Flammable gas. Forms explosive mixtures with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Vapours form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with approved device. No part of a container should be subjected to temperature higher than 52 degrees C. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

7. Handling and storage

Protect cylinder from damage. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. Close valve after each use; keep closed even when empty.

Storage

- : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable, liquid and gas under pressure. Do not breathe gas. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system constructed of corrosion resistant materials. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Blow the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 20 feet or use a barricade of non-combustible material. This barricade should be at least 5 feet high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage area must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 125 °F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods. For full details and requirements, see NFPA 50A, published by the National Fire Protection Association.

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, Guidelines for Handling Gas Cylinders and Containers. Obtain from your local supplier.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
n-hexane	US ACGIH 1/2009	50	-	-	-	-	-	-	-	-	[1]
	AB 4/2009	50	176	-	-	-	-	-	-	-	[1]
	BC 10/2009	20	-	-	-	-	-	-	-	-	[1]
	ON 8/2008	50	176	-	-	-	-	-	-	-	
	QC 6/2008	50	176	-	-	-	-	-	-	-	[1]

[1] Absorbed through skin.

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Select in accordance with provincial regulations, local bylaws or guidelines. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." Respirators should also be approved by NIOSH and MSHA.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Other protection : Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and chemical properties

Physical state	: Liquid. [COLORLESS LIQUID WITH A MILD GASOLINE-LIKE ODOR]
Flash point	: Closed cup: -23.15°C (-9.7°F) [Cleveland.]
Burning time	: Not applicable.
Burning rate	: Not applicable.
Auto-ignition temperature	: 224.85°C (436.7°F)
Flammable limits	: Lower: 1.7% Upper: 7.7%
Color	: Clear Colorless.
Odor	: MILD, GASOLINE-LIKE [Slight]
Taste	: Tasteless.
Molecular weight	: 86.2 g/mole
Molecular formula	: C6-H14
pH	: Not available.
Boiling/condensation point	: 68.9°C (156°F)
Melting/freezing point	: -139.4°C (-218.9°F)
Critical temperature	: 234.3°C (453.7°F)
Relative density	: 0.659
Vapor pressure	: 16.1 kPa (121 mm Hg)
Vapor density	: 3 [Air = 1]
Volatility	: 100% (v/v)
Odor threshold	: Not available.
Evaporation rate	: 6.82 (butyl acetate = 1)
Viscosity	: Not available.
Ionicity (in water)	: Not available.
Dispersibility properties	: Not available.
Solubility	: Not Available
Physical/chemical properties comments	: Not available.
COEFFICIENT OF WATER/OIL DISTRIBUTION:	: Not available.

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Materials to avoid	: Highly reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
-------------------------	--------	---------	------	----------

11. Toxicological information

n-hexane	LD50 Oral	Rat	25 g/kg	-
	LDLo	Rat	9100 mg/kg	-
	Intraperitoneal			
	TDLo Oral	Rat	20000 mg/kg	-
	LC50 Inhalation	Rat	627000 mg/m3	3 minutes
	Vapor			
	LC50 Inhalation	Rat	48000 ppm	4 hours
	Gas.			

Conclusion/Summary : Not available.

Chronic toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Not available.					

Sensitizer

Product/ingredient name	Route of exposure	Species	Result
Not available.			

Conclusion/Summary : Not available.

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Not available.						

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Not available.			

Conclusion/Summary : Not available.

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Not available.						

Conclusion/Summary : Not available.

Synergistic products : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
-------------------------	------	--------	---------	----------

12. Ecological information

n-hexane	-	Acute LC50 113000 ug/L Fresh water	Fish - Mozambique tilapia - Tilapia mossambica - 99 mm - 10 g	96 hours
	-	Acute LC50 2500 to 2980 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - 31 days - 20.4 mm - 0.123 g	96 hours

Conclusion/Summary : Not available.

Persistence/degradability

Product/ingredient name	Test	Result	Dose	Inoculum
Not available.				

Conclusion/Summary : Not available.

Octanol/water partition coefficient : Not available.

Bioconcentration factor : Not available.

Mobility : Not available.

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.


Waste stream : Not available.

RCRA classification : Not available.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	1208	Hexanes	3	-		- PRODUCT REPORTABLE QUANTITY (PRQ): Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.

PG* : Packing group

SPECIAL SHIPPING INFORMATION:

14. Transport information

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

15. Regulatory information

United States inventory (TSCA 8b) : This material is listed or exempted.

WHMIS (Canada) : ClassB-2: Flammable liquid
Class D-2B: Material causing other toxic effect (Toxic).

Canadian lists : **CEPA Toxic substances**: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Canada inventory : This material is listed or exempted.

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

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : **Flammable liquid and vapor**. May form explosive mixtures with air. May irritate the eyes, skin, and respiratory tract. Has anesthetic effects in high concentrations. May cause nervous system damage. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. Under ambient conditions, this is colorless liquid.

Hazardous Material Information System (U.S.A.) :

Health	1
Flammability	3
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

References : Not available.

16. Other information

Other special considerations : Not available.

Date of printing : 3/24/2015.

Date of issue : 3/24/2015.

Date of previous issue : No previous validation.

Version : 0.01

Indicates information that has changed from previously issued version.

Notice to reader

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.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: Not Applicable

PIN-INDEXED YOKE: Not applicable.

**ULTRA-HIGH-
INTEGRITY
CONNECTION:** Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

For more in-depth information for each component, refer to the pure product MSDS.

The information contained in this MSDS is generated from technical sources using the Chemmate Mixture MSDS system and the pure-product MSDS for each component. These mixtures are not tested as a whole for chemical, physical, or health effects.

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Praxair and the *Flowing Airstream* design are trademarks of
Praxair Canada Inc.

Other trademarks used herein are trademarks or registered trademarks of their respective owners.

16. Other information



Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : HYDREX^{TM/MC} AW 100

Product code : HDXAW10IBC, HDXAW10P5R, HDXAW10P20, HDXAW10DRR, HDXAW10DRM, HDXAW10DCT, HDXAW10, HDXAW10BLK

Manufacturer or supplier's details
Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga ON L5J 1K2
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : These products are designed for use as heavy duty hydraulic power transmission fluids and for lubrication where good anti-wear and anti-oxidation properties are required. They would typically be used in high-pressure hydraulic systems, machine tools, presses, compressors, pumps, gear sets, and centralized bearing lubrication systems.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	Pale, straw-yellow.
Odour	Mild petroleum oil like.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Aggravated Medical Condition : None known.

Carcinogenicity:

IARC

No component of this product present at levels greater than or

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

No hazardous ingredients

SECTION 4. FIRST AID MEASURES

- If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.
- In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.
- If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.
- Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

- | | |
|--------------------------------------|---|
| Unsuitable extinguishing media | : No information available. |
| Specific hazards during firefighting | : Cool closed containers exposed to fire with water spray. |
| Hazardous combustion products | : Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion. |
| Further information | : Prevent fire extinguishing water from contaminating surface water or the ground water system. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Material can create slippery conditions. |
| Environmental precautions | : Do not allow uncontrolled discharge of product into the environment. |
| Methods and materials for containment and cleaning up | : Prevent further leakage or spillage if safe to do so.
Remove all sources of ignition.
Soak up with inert absorbent material.
Non-sparking tools should be used.
Ensure adequate ventilation.
Contact the proper local authorities. |

SECTION 7. HANDLING AND STORAGE

- | | |
|-----------------------------|---|
| Advice on safe handling | : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use. |
| Conditions for safe storage | : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight. |

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : organic vapour filter

Hand protection
Material : neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R).

Remarks : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection : Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures : Wash contaminated clothing before re-use.
No special protective equipment required.

Hygiene measures : Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : viscous liquid

Colour : Pale, straw-yellow.

Odour : Mild petroleum oil like.

Odour Threshold : No data available

pH : No data available

Pour point : -29 °C (-20 °F)

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

Boiling point/boiling range	: No data available
Flash point	: 266 °C (511 °F) Method: Cleveland open cup
Fire Point	: No data available
Auto-Ignition Temperature	: No data available
Evaporation rate	: No data available
Flammability	: Low fire hazard. This material must be heated before ignition will occur.
Upper explosion limit	: No data available
Lower explosion limit	: No data available
Vapour pressure	: No data available
Relative vapour density	: No data available
Density	: 0.8727 kg/l (15 °C / 59 °F)
Solubility(ies)	
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Viscosity, kinematic	: 101 cSt (40 °C / 104 °F) 11.56 cSt (100 °C / 212 °F)
Explosive properties	: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	: No data available
Incompatible materials	: Reactive with oxidising agents and reducing agents.
Hazardous decomposition products	: May release CO _x , H ₂ S, metal oxides, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of : Eye contact

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

exposure

Ingestion
Inhalation
Skin contact

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

49 CFR

Not regulated as a dangerous good

TDG

Not regulated as a dangerous good

Material Safety Data Sheet

HYDREX^{TM/MC} AW 100

000003000071



Version 3.0

Revision Date 2015/10/02

Print Date 2015/10/02

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : Not controlled.

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory
IECSC	One or more components has been notified but may not be listed in the inventory.

SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : 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: lubricants.petro-canada.ca/msds
Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518
Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285
For Product Safety Information: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081

Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : JET A/A-1 AVIATION TURBINE FUEL

Synonyms : Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Aviation Turbine Fuel, Kerosene Type (CAN/CGSB 3.23 & CAN/CGSB 3.24)

Product code : 101851, 100123

Manufacturer or supplier's details
Petro-Canada
P.O. Box 2844, 150 - 6th Avenue South-West
Calgary Alberta T2P 3E3
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : 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 (if it contains a lubricity additive) and heating oil.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Clear liquid.
Colour	Clear and colourless
Odour	Kerosene-like.
Hazard Summary	Combustible liquid. Irritating to skin. Possible risk of harm to the unborn child.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Inhalation : Inhalation may cause central nervous system effects.
Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

consciousness.

Skin : May irritate skin.

Eyes : May irritate eyes.

Ingestion : Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Aspiration hazard if swallowed - can enter lungs and cause damage.

Aggravated Medical Condition : None known.

Carcinogenicity:

IARC

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH

Confirmed animal carcinogen with unknown relevance to humans

Kerosene

8008-20-6

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
kerosine (petroleum)	8008-20-6	90 - 100 %
2-(2-methoxyethoxy)ethanol	111-77-3	0 - 0.2 %

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

- | | |
|---|---|
| In case of eye contact | : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention. |
| If swallowed | : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice. |
| Most important symptoms and effects, both acute and delayed | : First aider needs to protect himself. |

SECTION 5. FIREFIGHTING MEASURES

- | | |
|---|---|
| Suitable extinguishing media | : Dry chemical
Carbon dioxide (CO ₂)
Water fog.
Foam |
| Unsuitable extinguishing media | : Do NOT use water jet. |
| Specific hazards during firefighting | : Cool closed containers exposed to fire with water spray. |
| Hazardous combustion products | : Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion. |
| Further information | : Prevent fire extinguishing water from contaminating surface water or the ground water system. |
| Special protective equipment for firefighters | : Wear self-contained breathing apparatus for firefighting if necessary. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|---|
| Personal precautions, protective equipment and emergency procedures | : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Material can create slippery conditions. |
| Environmental precautions | : If the product contaminates rivers and lakes or drains inform respective authorities. |
| Methods and materials for containment and cleaning up | : Prevent further leakage or spillage if safe to do so.
Remove all sources of ignition.
Soak up with inert absorbent material.
Non-sparking tools should be used.
Ensure adequate ventilation.
Contact the proper local authorities. |



SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use.
- Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum)	8008-20-6	TWA	200 mg/m ³ (As total hydrocarbon vapour)	CA BC OEL

- Engineering measures** : Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

- Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Filter type : A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

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.

Hand protection
Material

: polyvinyl alcohol (PVA), Viton(R). 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.

Remarks

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eye protection

: Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection

: Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Protective measures

: Wash contaminated clothing before re-use.

Hygiene measures

: Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

: Clear liquid.

Colour

: Clear and colourless

Odour

: Kerosene-like.

Odour Threshold

: No data available

pH

: No data available

Pour point

: -51 °C (-60 °F) No data available

Boiling point/boiling range

: 140 - 300 °C (284 - 572 °F)

Flash point

: > 38 °C (100 °F)
Method: Tagliabue

Auto-Ignition Temperature

: 210 °C (410 °F)

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL



000003001081

Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Evaporation rate	: No data available
Flammability	: 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.
Upper explosion limit	: 5 %(V)
Lower explosion limit	: 0.7 %(V)
Vapour pressure	: 5.25 mmHg (20 °C / 68 °F)
Relative vapour density	: 4.5
Relative density	: 0.775 - 0.84 (15 °C / 59 °F)
Solubility(ies)	
Water solubility	: No data available
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Viscosity, kinematic	: 1.0 - 1.9 cSt (40 °C / 104 °F)
Explosive properties	: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	: Extremes of temperature and direct sunlight.
Incompatible materials	: Reactive with oxidising agents, acids and alkalis.
Hazardous decomposition products	: May release CO _x , NO _x , SO _x , aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Eye contact Ingestion Inhalation Skin contact
--	--

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081



Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Components:

kerosine (petroleum):

Acute oral toxicity : LD50 Rat: > 5,000 mg/kg,

Acute inhalation toxicity : LC50 Rat: > 5 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 Rabbit: > 2,000 mg/kg,

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

000003001081

Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14



SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL



000003001081

Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

UN/ID No. : 1863
Proper shipping name : Fuel, aviation, turbine engine
Class : 3
Packing group : III
Labels : 3
Packing instruction (cargo aircraft) : 366

IMDG-Code

UN number : 1863
Proper shipping name : FUEL, AVIATION, TURBINE ENGINE
Class : 3
Packing group : III
Labels : 3
EmS Code : F-E, S-E
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

TDG

UN number : 1863
Proper shipping name : FUEL, AVIATION, TURBINE ENGINE
Class : 3
Packing group : III
Labels : 3
ERG Code : 128
Marine pollutant : no

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : B3: Combustible Liquid
D2A: Very Toxic Material Causing Other Toxic Effects
D2B: Toxic Material Causing Other Toxic Effects

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL On the inventory, or in compliance with the inventory
TSCA All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL



000003001081

Version 1.0

Revision Date 2015/05/14

Print Date 2015/05/14

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

For Product Safety Information: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.



Material Safety Data Sheet

EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)

(CAN) CANUTEC : 1(613) 996-6666 (24hrs)

(USA) Anachemia : 1(518) 297-4444

(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: E D-1A D-2A		TDG CLASS: 8 PIN: UN2809 PG: III

Section I. Product Identification and Uses

Product name	MERCURY	CI#	Not available.
Chemical formula	Hg	CAS#	7439-97-6
Synonyms	Quicksilver, AC-5666, AC-5666T, 55982, 56004	Code	AC-5666
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	Formula weight	200.59
		Supersedes	
Material uses	For laboratory use only.		

Section II. Ingredients

Name	CAS #	%	TLV
1) MERCURY	7439-97-6	100	Exposure limits: ACGIH (Metallic mercury (as Hg)) TWA 0.025 mg(Hg)/m3 (Skin)

Toxicity values of the hazardous ingredients

MERCURY:
LD50: Not available.
LC50: Not available.

Section III. Physical Data

MERCURY

page 2/4

Physical state and appearance / Odor	Silver metallic liquid. Odorless.
pH (1% soln/water)	Not available.
Odor threshold	Not applicable.
Percent volatile	Not available.
Freezing point	-38.89°C
Boiling point	356.9°C
Specific gravity	13.6 (Water = 1)
Vapor density	7 (Air = 1)
Vapor pressure	1 mm Hg @ 126°C
Water/oil dist. coeff.	Not applicable.
Evaporation rate	<<1
Solubility	Very slightly soluble in cold water.

Section IV. Fire and Explosion Data

Flash point	Not applicable.
Flammable limits	Not applicable.
Auto-ignition temperature	Not applicable.
Fire degradation products	Mercury. Oxides of mercury.
Fire extinguishing procedures	Use extinguishing media appropriate to surrounding fire conditions. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
Fire and Explosion Hazards	The sensitivity to impact is not applicable. The sensitivity to static discharge is not applicable. Emits toxic fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Inhalation and ingestion. Eye contact. Skin absorption.
Effects of Acute Exposure	May be fatal by ingestion, inhalation or skin absorption. Target organs: respiratory system, eyes, skin, kidney, central nervous system, reproductive system. 10 mg/m3 (MERCURY) is immediately dangerous to life or health.
Eye	Causes irritation or burns.
Skin	Causes skin irritation. May cause dermatitis. May cause allergic skin reaction. Liquid can be absorbed in toxic amounts through intact skin. See inhalation.
Inhalation	May cause respiratory tract inflammation and damage. Coughing, dyspnea, tachypnea, metallic taste, headache, nausea, vomiting, diarrhea, fever, bronchitis, irritability, lethargy, agitation, trembling, pneumonitis, emphysema, kidney damage, pulmonary edema. May cause nervous system disturbances. See chronic effects.
Ingestion	Burns in mouth, pharynx and gastrointestinal tract. May cause nausea, vomiting, abdominal pain, diarrhea, metallic taste, salivation, ulcers, hemorrhagic gastritis, and death. See inhalation.

Section V. Toxicological Properties

MERCURY

page 3/4

Effects of Chronic Overexposure

May cause sensitization by skin contact. May cause mercurialism: central nervous system effects, headache, weakness, anorexia, depression, loss of weight, salivation, fatigue, muscle tremors, metallic taste, skin rashes, gingivitis, stomatitis, coloration of the eye lids, photophobia, pyorrhea, blue line on gums, pain, nephritis, diarrhea, anxiety, insomnia, irritability, mental troubles, peripheral neuropathy, central nervous system, nerve, brain, liver and kidney (proteinuria, hypoproteinemia, edema) damage or failure. Neurotoxic effects (insomnia, irritability, loss of memory, depression). Passes through the placental barrier in animal. Teratogen. May cause reproductive effects based on studies in laboratory animals. Carcinogenic effects: Not available. Mutagenic effects: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

Section VI. First Aid Measures

Eye contact

Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention.

Skin contact

Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Discard contaminated clothing and shoes.

Inhalation

Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.

Ingestion

If conscious, wash out mouth with water. Have conscious person drink several glasses of water to dilute. Induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person.

Section VII. Reactivity Data

Stability

Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination, air.

Hazardous decomp. products

Not available.

Incompatibility

Metals (calcium, lithium, sodium, potassium, rubidium, nickel, copper, iron, zinc, aluminum and thier alloys, etc.), acetylene, acetylenic compounds, ethylene, oxidizing agents, ammonia, mineral acids, halogens, boron diiodophosphide, nitric acid, sulfuric acid, 3-bromopropane, 3-bromopropyne, amines, perchlorates, tetracarbonylnickel, bromine, methylsilane, ethylene oxide, oxalic acid, peroxyformic acid, methyl azide, sodium carbide, nitromethane, alkalies, nitrates, chlorates, chlorine dioxide, azides, metal oxides and carbonyles.

Reaction Products

Corrosive to aluminum. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

MERCURY

page 4/4

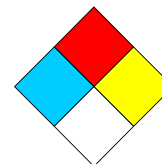
Protective Clothing in case of spill and leak	Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
Spill and leak	Evacuate the area. Absorb spilled mercury with specially designed mercury spill kits. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material.
Waste disposal	Material in the elemental state should be recovered and either reused or recycled. According to all applicable regulations. Harmful to aquatic life at low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.
Storage and Handling	Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.).

Section IX. Protective Measures

Protective clothing	Splash goggles. Impervious rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: face shields, rubber suits, aprons, and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.
Engineering controls	Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Do not use in unventilated spaces.

Section X. Other Information

Special Precautions or comments	Corrosive! Highly toxic! Teratogen! Neurotoxic! Nephrotoxic! Sensitizer! Readily absorbed through skin. Possible risks of irreversible effects. Danger of cumulative effects. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Handle and open container with care. Container should be opened only by a technically qualified person. Synergistic materials: Not available. RTECS NO: OV4550000 (Mercury).
--	---



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 25-Oct-2012

Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.



Material Safety Data Sheet










EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)

(CAN) CANUTEC : 1(613) 996-6666 (24hrs)

(USA) Anachemia : 1(518) 297-4444

(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: E C D-1A		TDG CLASS: 8 PIN: UN2031 PG: II
  	    	

Section I. Product Identification and Uses

Product name	NITRIC ACID 5 - <10%	CI#	Not available.
Chemical formula	HNO ₃ in H ₂ O	CAS#	Not applicable.
Synonyms	Nitric acid 1N, R-3810A, M-5820, M-5828, M-10855, 62844	Code	R-3810A
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	Formula weight	Not applicable.
		Supersedes	
Material uses	For laboratory use only.		

Section II. Ingredients

Name	CAS #	%	TLV
1) NITRIC ACID	7697-37-2	5-<10	Exposure limits: ACGIH TWA 2 ppm (5.2 mg/m ³); STEL 4 ppm (10 mg/m ³)
2) WATER	7732-18-5	Balance	Not established by ACGIH

Toxicity values of the hazardous ingredients

NITRIC ACID:

ORAL (LDLo): Acute: 430 mg/kg (Human).

UNREPORTED (LDLo): Acute: 110 mg/kg (Human).

INHALATION (LC50): Acute: 130 mg/m³ (Rat) (4 hour(s)).

Section III. Physical Data**NITRIC ACID 5 - <10%**

page 2/4

Physical state and appearance / Odor	Clear, colorless to slightly yellow fuming aqueous solution. Pungent and suffocating acid odor.
pH (1% soln/water)	<7
Odor threshold	Not available.
Percent volatile	100% (V/V)
Freezing point	Not available.
Boiling point	Not available.
Specific gravity	>1 (Water = 1)
Vapor density	>1 (Air = 1)
Vapor pressure	Not available.
Water/oil dist. coeff.	Not available.
Evaporation rate	<1
Solubility	Miscible in water.

Section IV. Fire and Explosion Data

Flash point	Not applicable.
Flammable limits	Not applicable.
Auto-ignition temperature	Not applicable.
Fire degradation products	Oxides of nitrogen (NO, NO ₂ , N ₂ O, N ₂ O ₃) plus nitric acid mist or vapor.
Fire extinguishing procedures	Use flooding quantities of water. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode. Cool containing vessels with flooding quantities of water until well after fire is out.
Fire and Explosion Hazards	Oxidizing agent; may ignite oxidizable materials. Contributes to combustion of other materials. Container explosion may occur under fire conditions or when heated. Contact with other material may cause fire and/or explosion. Flammable/explosive hydrogen gas may be formed upon contact of this product with metals. Emits toxic and corrosive fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Ingestion and inhalation. Eye contact. Skin contact.
Effects of Acute Exposure	May be fatal by ingestion, inhalation, or by skin absorption. Corrosive to skin and eyes on contact. Possible risks of irreversible effects. Effects may be delayed. Target organs: eyes, skin, respiratory system, lungs, teeth. 25 ppm (NITRIC ACID) is immediately dangerous to life or health.
Eye	Causes severe burns and loss of vision. Eye contact can result in corneal damage or blindness. May cause permanent damage.
Skin	Causes severe burns, blisters and yellow skin discoloration.
Inhalation	Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, laryngitis, bronchitis, dyspnea, headache, nausea, and vomiting. May cause delayed lung injury.
Ingestion	Burns in mouth, pharynx and gastrointestinal tract. Risk of vomiting, nausea, diarrhea, abdominal pain, stomach perforation, convulsions, kidney damage, coma and death.

Section V. Toxicological Properties

NITRIC ACID 5 - <10%

page 3/4

Effects of Chronic Overexposure

May cause erosion of the teeth, lesions of the skin, bronchial irritation, coughing, pneumonia and lung damage. Repeated or prolonged exposure to the substance can produce target organs damage. Carcinogenic effects: Not available. Mutagenic effects: Not available. Teratogenic effects: Not available. Toxicity of the product to the reproductive system: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

Section VI. First Aid Measures

Eye contact

Immediate first aid is needed to prevent eye damage. Washing within 1 minute is essential to achieve maximum effectiveness. IMMEDIATELY flush eyes with copious quantities of water for at least 30 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention. If irritation persists, repeat flushing.

Skin contact

Immediate first aid is needed to prevent skin damage. IMMEDIATELY flush skin with running water for at least 30 minutes. Remove contaminated clothing, protecting your own hands and body. Seek immediate medical attention. If irritation persists, repeat flushing. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport. Wash contaminated clothing before reusing.

Inhalation

Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.

Ingestion

If conscious, wash out mouth with water. Have conscious person drink several glasses of water or milk. DO NOT induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person. Guard against aspiration into lungs. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water.

Section VII. Reactivity Data

Stability

Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination.

Hazardous decomp. products

Various nitrogen oxides, including (NO, NO₂, N₂O₃, N₂O) all mixed with nitric acid mist and vapor.

Incompatibility

Reducing agents, combustible materials, wood, paper, cotton, and similar organic materials, organic chemicals, fluorine, phosphine, carbonates, diborane, hydrocarbons, dichromates. Reacts with most common metals to produce hydrogen. Bases, alkalis, aluminum, iron, copper, resins, sulfides, ammonia, amines, heat. Explosive reaction with alcohols, turpentine, hydrogen sulfide, metal powders, carbides, organic materials (acetone, acetic acid, methanol, formaldehyde, ether, etc.), non-metals (boron, phosphorus, carbon, etc.), hydrazine, acids, peroxides, silicides, phosphides, salicylates, non-metal oxides, thiols, nitrides, cyanates, ketones, interhalogens, boron phosphide, cyanides, acetylides, silver compounds, mercury(II) compounds, thiocyanates, ammonium nitrate, hexacyanoferrates, phosphorus compounds, zinc ethoxide, azides, alkali metals.

Reaction Products

Corrosive to metals. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

NITRIC ACID 5 - <10%

page 4/4

Protective Clothing in case of spill and leak

Wear self-contained breathing apparatus, neoprene boots and neoprene gloves. Full suit.

Spill and leak

Evacuate and ventilate the area. Eliminate all sources of ignition. Cover with soda ash or lime. Adequate ventilation is required for soda ash due to release of carbon dioxide gas. Place in a suitable container and mark for disposal. Wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material. Avoid contact with a combustible material (wood, paper, oil, clothing...).

Waste disposal

According to all applicable regulations. Harmful to aquatic life at very low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Storage and Handling

Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Store in stainless steel drums. Avoid contact with a combustible material (wood, paper, oil, clothing...). Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.).

Section IX. Protective Measures

Protective clothing

Face shield and splash goggles. Impervious neoprene gloves, synthetic apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: neoprene suits and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

Engineering controls

Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Ventilation should be corrosion proof. Do not use in unventilated spaces.

Section X. Other Information

Special Precautions or comments

Corrosive liquid! Oxidizing agent; may ignite oxidizable materials. Highly toxic! Causes severe burns which may be delayed! Risk of serious damage to eyes. Possible risks of irreversible effects. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Contact with other material may cause fire and/or explosion. When diluting, always add acid to water, not water to acid. Heat is generated by dilution. Handle and open container with care. Container should be opened only by a technically qualified person. Note to physician: Medical conditions that may be aggravated by exposure include asthma, bronchitis, emphysema, and other lung diseases and chronic nose, sinus, or throat conditions. In the event of skin or eye contact, rapid and thorough flushing is essential. RTECS NO: QU5775000 (Nitric acid).



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 07-Jan-2013

Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

1 Identification of substance

- **Product details**

- **Trade name:** Oxygen

- **Article number:** 124-01-0006

- **Creation date:** 06/13/2008

- **Manufacturer/Supplier:**

Linde Canada Limited	Linde	.
5860 Chedworth Way	575 Mountain Avenue	.
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974	.
Telephone (905) 501-1700	Telephone (908) 464-8100	.
24-HOUR EMERGENCY TELEPHONE NUMBER:	24-HOUR EMERGENCY TELEPHONE NUMBER	.
: (905) 501-0802	CHEMTREC (800) 424-9300 OR	.
	Linde National Operations Center (800) 232-4726	.

Pse ensure that this MSDS is received by the appropriate person.

- **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

- **Chemical characterization:**

- **CAS No. Description**

7782-44-7 Oxygen

- **Identification number(s)**

- **EINECS Number:** 231-956-9

- **Index number:** 008-001-00-8

3 Hazards identification

- **Hazard description:**

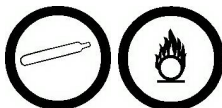


Oxidizing

- **WHMIS-symbols:**

A - Compressed gas

C - Oxidizing materials



- **HMIS-ratings (scale 0 - 4)**

HEALTH	0
FIRE	0
REACTIVITY	3

Health = 0

Fire = 0

Reactivity = 3

(Contd. on page 2)

CDN

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 1)

· NFPA ratings (scale 0 - 4)



Health = 0

Fire = 0

Reactivity = 3

· Information pertaining to particular dangers for man and environment:

Contact with combustible material may cause fire.

· Classification system:

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

· GHS label elements

**Danger**

2.4/1 - May cause or intensify fire; oxidizer.

**Warning**

2.5/C - Contains gas under pressure; may explode if heated.

· Prevention:

Keep/Store away from clothing/combustible materials.

Keep reduction valves free from grease and oil.

· Response:

In case of fire: Stop leak if safe to do so.

· Storage:

Protect from sunlight. Store in a well-ventilated place.

Store in a well-ventilated place.

4 First aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable.

5 Fire fighting measures

- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Eliminate ignition sources
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.
- **Measures for cleaning/collecting:** Ensure adequate ventilation.

CDN

(Contd. on page 3)

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 2)

7 Handling and storage

- **Handling:**

- **Information for safe handling:**

Handle with care. Avoid jolting, friction, and impact.

Use only in well ventilated areas.

Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.

- **Information about protection against explosions and fires:**

Keep ignition sources away - Do not smoke.

Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.

- **Storage:**

- **Requirements to be met by storerooms and receptacles:**

Do not expose cylinder to temperatures higher than 50°C (122 °F)

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

- **Information about storage in one common storage facility:**

Store separately from cylinders containing flammables by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.

Sources of ignition should be removed from storage area.

- **Further information about storage conditions:**

Store cylinder in a well ventilated area.

Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**

Adequate local ventilation.

Safety showers and eyewash stations should be nearby.

- **Components with limit values that require monitoring at the workplace:** Not required.

- **Additional information:** The lists that were valid during the creation were used as basis.

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Wash hands before breaks and at the end of work.

Protective clothing and PPE should be kept free of oil and grease, generally in clean condition

PPE should be inspected and maintained regularly to retain effectiveness.

- **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

- **Protection of hands:**



Protective gloves.

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

(Contd. on page 4)

CDN

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 3)

· **Eye protection:** Safety glasses

9 Physical and chemical properties

· General Information

Form:	Gaseous.
Color:	Colorless
Odor:	Odorless

· Change in condition

Melting point/Melting range:	-219°C
Boiling point/Boiling range:	-182°C

Flash point:	Not applicable.
---------------------	-----------------

Flammability (solid, gaseous):	Contact with combustible material may cause fire.
---------------------------------------	---

Danger of explosion:	Explosive when mixed with combustible material.
-----------------------------	---

· Solubility in / Miscibility with

Water at 20°C:	39 g/l
-----------------------	--------

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

· **Materials to be avoided:**

· Dangerous reactions

May react violently with reducing agents.

Violently oxidises organic substances.

May react violently with combustible substances.

· **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:** LC50 - None available

· **Primary irritant effect:**

· **on the skin:** No irritating effect.

· **on the eye:** No irritating effect.

· **Sensitization:** No sensitizing effects known.

12 Ecological information

· **Additional ecological information:**

· **General notes:** Generally not hazardous for water

13 Disposal considerations

· **Product:**

· **Recommendation:** Unused product should be returned to vendor.

· **Uncleaned packagings:**

· **Recommendation:**

Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

(Contd. on page 5)

CDN

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 4)

· Recommended cleansing agent: None applicable.

14 Transport information

· TDG and DOT regulations:



· Hazard class: 2.2
 · Identification number: UN1072
 · Packing group: -
 · Proper shipping name (technical name): OXYGÈNE COMPRIMÉ
 · Label: 2.2+5.1
 · Packaging group: -

· Maritime transport IMDG:



· IMDG Class: 2.2
 · UN Number: 1072
 · Label: 2.2+5.1
 · Packaging group: -
 · EMS Number: F-C,S-W
 · Marine pollutant: No
 · Proper shipping name: OXYGEN, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



· ICAO/IATA Class: 2.2
 · UN/ID Number: 1072
 · Label: 2.2+5.1
 · Packaging group: -
 · Proper shipping name: OXYGEN, COMPRESSED

· UN "Model Regulation": UN1072, OXYGEN, COMPRESSED, 2.2 (5.1)

15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

(Contd. on page 6)

-CDN-

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 5)

- **Proposition 65**

- **Chemicals known to cause cancer:**

- Substance is not listed.

- **Chemicals known to cause reproductive toxicity for females:**

- Substance is not listed.

- **Chemicals known to cause reproductive toxicity for males:**

- Substance is not listed.

- **Chemicals known to cause developmental toxicity:**

- Substance is not listed.

- **Carcinogenicity categories**

- **EPA (Environmental Protection Agency)**

- Substance is not listed.

- **NTP (National Toxicology Program)**

- Substance is not listed.

- **TLV (Threshold Limit Value established by ACGIH)**

- Substance is not listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

- Substance is not listed.

- **OSHA-Ca (Occupational Safety & Health Administration)**

- Substance is not listed.

- **Canadian substance listings:**

- **Canadian Domestic Substances List (DSL)**

- Substance is listed.

- **Canadian Ingredient Disclosure list (limit 0.1%)**

- Substance is not listed.

- **Canadian Ingredient Disclosure list (limit 1%)**

- Substance is not listed.

- **Product related hazard informations:**

The product was 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.

- **Hazard symbols:**

- Oxidizing

- **Risk phrases:**

- Contact with combustible material may cause fire.

- **Safety phrases:**

- After contact with skin, was immediately with plenty.....(to be specified by the manufacturer)

- Keep out of the reach of children.

- Keep away from combustible material.

*

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the

(Contd. on page 7)

Material Safety Data Sheet

Printing date 10/06/2014

Version 12

Reviewed on 10/06/2014

Trade name: Oxygen

(Contd. of page 6)

consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· Department issuing MSDS:

Customer Service Centre: 1-866-385-5349

Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

EL: Exposure Limit per ACGIH TLV

EV: Permissible Exposure Limit per OSHA

N/A: Not Applicable

CDN

SECTION 1 - PRODUCT INFORMATION

Product Identifier: 50-010 BREEZE INTERIOR S/G LATEX-WHITE			
Product Use: Protective Coating			
Manufacturer's Name: General Paint Corp.		Supplier's Name: General Paint Corp.	
Street Address: 950 Raymur Ave		Street Address: 950 Raymur Ave	
City: Vancouver	Province: BC	City: Vancouver	Province: BC
Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022	Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022

SECTION 2 - HAZARDOUS INGREDIENTS

Hazardous Ingredients(<i>Specific</i>)	%	CAS Number	LD 50 of Ingredient(Specify species,route)	LC 50 of Ingredient(Specify species)
TITANIUM DIOXIDE	16 - 18	13463-67-7	NOT AVAILABLE	NOT AVAILABLE
PROPYLENE GLYCOL	2.36 - 2.38	57-55-6	20000 MG/KG(ORAL, RAT)	NOT AVAILABLE

SECTION 3 - PHYSICAL DATA

Physical State: Liquid	Odour and Appearance: liquid with a slight ammonia smell	Coating VOC(gm/l): 130	Odour Threshold(ppm): Not Available
Specific Gravity: 1.22	Vapor Density(air=1): Not Available	Vapor Pressure(mmHg): Not Available	Evaporation Rate: Not Available
Boiling Point(° C): Greater than 100°C	Freezing Point(° C): Less than 0°C	pH: 8.5-9.5	Coefficient of Water/Oil Distribution: Not Available

SECTION 4 - FIRE AND EXPLOSION DATA

Flammability: No	If yes, Under which Conditions? Not Applicable	
Means of Extinction: Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
Flashpoint and Method: "Not Applicable	Upper Flammable Lt (% by Volume): Not Applicable	Lower Flammable Lt (% by Volume): Not Applicable
Autoignition Temperature: Not Applicable	Explosion Data - Sensitivity to Impact: No	Explosion Data - Sensitivity to Static discharges: No
Hazardous Combustion Pdts: carbon monoxide, carbon dioxide, acrid, irritant fumes (components not specified), nitrogen oxides, sulfur oxides, ammonium nitrate, nitrogen, nitrogen dioxide		

SECTION 5 - REACTIVITY DATA

Chemical Stability: Stable	If Yes, Under which Conditions? Not Applicable
Incompatibility with other substances: Yes	If yes, which ones? Strong Acids Strong Oxidizing agents
Reactivity, and under what conditions? heat, generation of dust, temperatures above 320°C	
Hazardous Decomposition Products: oxides of nitrogen, acetaldehyde, acetic acid, ammonia, aldehydes, hydrogen	

SECTION 6 - TOXICOLOGICAL PROPERTIES

Route of Entry	Skin Contact: Yes	Absorption: Yes	Eye Contact: Yes	Inhalation: Yes	Ingestion: Yes
Effects to Acute exposure to Product: Insufficient Data					
Effects to Chronic exposure to Product: PROPYLENE GLYCOL has been known to cause LACTIC ACIDOSIS.					
Exposure Limits (Value,Units,By) TITANIUM DIOXIDE: 10 mg/m3 ACGIH PROPYLENE GLYCOL: 10 mg/m3 AIHA					
Irritancy (if yes, explain)					
Sensitization (if yes, explain)			Carcinogenicity (if yes, explain) TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
Reproductive Toxicity (if yes, explain)			Teratogenicity (if yes, explain)		
Mutagenicity (if yes, explain)			Synergistic Products (if yes, explain)		

SECTION 7 - PREVENTIVE MEASURES

Personal Protective Equipment	Gloves: No	Respirator: Yes	Eye: No	Footwear: No	Clothing: No	Other: No
If checked, specify type: Respirator: NIOSH APPROVED						
Engineering controls (specify such as ventilation, enclosed process): Use mechanical ventilation to reduce exposure, ground all equipment and avoid exposure to open flames or sparks.						
Leak and Spill Procedure: Wear adequate protective equipment and eliminate all ignition sources. Contain spill with absorbant material and place in a suitable covered and labeled container for disposal.						
Waste Disposal: Check with Federal, Provincial and local government regulations and requirements for disposal.						
Handling Procedures and Equipment: Use in a well ventilated area. Do not use with incompatible substances and keep away from heat and all ignition sources. Use grounded and non-sparking equipment only.						
Storage Requirements: Store in a cool, well ventilated area out of direct sunlight. Store away from heat and all ignition sources. Storage facility should be manufactured out of fire resistant materials.						
Special Shipping Information: None Required						

SECTION 8 - FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical help if there is any breathing difficulty.

Ingestion: Do not induce vomiting unless directed by a physician. If conscious and alert, give two glasses of water. Seek medical attention immediately.

Skin Contact: Remove Contaminated clothing (including shoes) and wash before reuse. Flush with large amounts of soap and water. If irritation persists, seek medical attention.

Eye Contact: Flush eyes with large amounts of lukewarm water for 20 minutes, while holding eyelids open or until irritation subsides. If irritation persist, get medical attention.

SECTION 9 - PREPARATION INFORMATION**Prepared by:**

General Paint Technical Dept

Phone:

(604) 253-3131

Preparation Date:

Aug 30, 2013

SECTION 1 - PRODUCT INFORMATION

Product Identifier: 12-060 FRESHTEX FLAT CEILING ALKYD			
Product Use: Protective Coating			
Manufacturer's Name: General Paint Corp.		Supplier's Name: General Paint Corp.	
Street Address: 950 Raymur Ave		Street Address: 950 Raymur Ave	
City: Vancouver	Province: BC	City: Vancouver	Province: BC
Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022	Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022

SECTION 2 - HAZARDOUS INGREDIENTS

Hazardous Ingredients(<i>Specific</i>)	%	CAS Number	LD 50 of Ingredient(Specify species,route)	LC 50 of Ingredient(Specify species)
TITANIUM DIOXIDE	8 - 10	13463-67-7	NOT AVAILABLE	NOT AVAILABLE
ALIPHATIC SOLVENT	8	64742-47-8	5000 MG/KG(ORAL, RAT)	NOT AVAILABLE
HEAVY NAPHTHA (HYDROTREATED)	16	64742-48-9	NOT AVAILABLE	NOT AVAILABLE

SECTION 3 - PHYSICAL DATA

Physical State: Liquid	Odour and Appearance: liquid with a solvent smell	Coating VOC(gm/l): 392	Odour Threshold(ppm): Not Available
Specific Gravity: 1.61	Vapor Density(air=1): Not Available	Vapor Pressure(mmHg): Not Available	Evaporation Rate: Not Available
Boiling Point(° C): Not Available	Freezing Point(° C): Not Available	pH: Not Applicable	Coefficient of Water/Oil Distribution: Not Available

SECTION 4 - FIRE AND EXPLOSION DATA

Flammability: Yes	If yes, Under which Conditions? Flammable Liquid	
Means of Extinction: Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
Flashpoint and Method: 60 °C Closed Cup	Upper Flammable Lt (% by Volume): Not Available	Lower Flammable Lt (% by Volume): Not Available
Autoignition Temperature: Not Available	Explosion Data - Sensitivity to Impact: No	Explosion Data - Sensitivity to Static discharges: No
Hazardous Combustion Pdts: carbon monoxide, carbon dioxide, calcium oxide, aldehydes, nitrogen		

oxides, sulfur oxides, magnesium oxide
--

SECTION 5 - REACTIVITY DATA

Chemical Stability: Stable	If Yes, Under which Conditions? Not Applicable
Incompatibility with other substances: Yes	If yes, which ones? Strong Acids Strong Oxidizing agents Strong Bases
Reactivity, and under what conditions? heat, ignition sources, potassium t-butoxide, generation of dust, nitric acid, dichlorohydrantion, heat, sparks, or other ignition sources	
Hazardous Decomposition Products: propylene oxide, carbon dioxide	

SECTION 6 - TOXICOLOGICAL PROPERTIES

Route of Entry	Skin Contact: Yes	Absorption: Yes	Eye Contact: Yes	Inhalation: Yes	Ingestion: Yes
Effects to Acute exposure to Product: ALIPHATIC SOLVENT has been known to cause HEADACHE and LOSS OF COORDINATION. HEAVY NAPHTHA (HYDROTREATED) has been known to cause HEADACHE, DIZZINESS and OTHER CENTRAL NERVOUS SYSTEM EFFECTS.					
Effects to Chronic exposure to Product: ALIPHATIC SOLVENT has been known to cause DERMATITIS, KIDNEY DAMMAGE.					
Exposure Limits (Value,Units,By) TITANIUM DIOXIDE: 10 mg/m3 ACGIH ALIPHATIC SOLVENT: N/A HEAVY NAPHTHA (HYDROTREATED): 1200 mg/m3 Manufacturer (ESSO)					
Irritancy (if yes, explain)					
Sensitization (if yes, explain)			Carcinogenicity (if yes, explain) TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
Reproductive Toxicity (if yes, explain)			Teratogenicity (if yes, explain)		
Mutagenicity (if yes, explain)			Synergistic Products (if yes, explain)		

SECTION 7 - PREVENTIVE MEASURES

Personal Protective Equipment	Gloves: Yes	Respirator: Yes	Eye: Yes	Footwear: No	Clothing: No	Other: No
If checked, specify type: Gloves: BUTYL RUBBER Respirator: NIOSH APPROVED Eye: SPLASH RESISTANT						
Engineering controls (specify such as ventilation, enclosed process): Use mechanical ventilation to reduce exposure.						
Leak and Spill Procedure: Wear adequate protective equipment and eliminate all ignition sources. Contain spill with absorbant material and place in a suitable covered and labeled container for disposal.						
Waste Disposal: Check with Federal, Provincial and local government regulations and requirements for disposal.						
Handling Procedures and Equipment: Use in a well ventilated area. Do not use with incompatible substances.						

Storage Requirements:

Store in a cool, well ventilated area out of direct sunlight.

Special Shipping Information:

TDG Shipping Name: PAINT Classification: 3.3 Packing Group: III Identification Number: UN1263

SECTION 8 - FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical help if there is any breathing difficulty.

Ingestion: Do not induce vomiting unless directed by a physician. If conscious and alert, give two glasses of water. Seek medical attention immediately.

Skin Contact: Remove Contaminated clothing (including shoes) and wash before reuse. Flush with large amounts of soap and water. If irritation persists, seek medical attention.

Eye Contact: Flush eyes with large amounts of lukewarm water for 20 minutes, while holding eyelids open or until irritation subsides. If irritation persist, get medical attention.

SECTION 9 - PREPARATION INFORMATION**Prepared by:**

General Paint Technical Dept

Phone:

(604) 253-3131

Preparation Date:

Mar 06, 2012

SECTION 1 - PRODUCT INFORMATION

Product Identifier: 57-010 KITCHEN & BATH, GLOSS - WHITE			
Product Use: Protective Coating			
Manufacturer's Name: General Paint Corp.		Supplier's Name: General Paint Corp.	
Street Address: 950 Raymur Ave		Street Address: 950 Raymur Ave	
City: Vancouver	Province: BC	City: Vancouver	Province: BC
Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022	Postal Code: V6A 3L5	Emergency Phone: (604) 253-4022

SECTION 2 - HAZARDOUS INGREDIENTS

Hazardous Ingredients(<i>Specific</i>)	%	CAS Number	LD 50 of Ingredient(Specify species,route)	LC 50 of Ingredient(Specify species)
TITANIUM DIOXIDE	16 - 20	13463-67-7	NOT AVAILABLE	NOT AVAILABLE
PROPYLENE GLYCOL	4.73 - 4.78	57-55-6	20000 MG/KG(ORAL, RAT)	NOT AVAILABLE

SECTION 3 - PHYSICAL DATA

Physical State: Liquid	Odour and Appearance: liquid with a slight ammonia smell	Coating VOC(gm/l): 218	Odour Threshold(ppm): Not Available
Specific Gravity: 1.22	Vapor Density(air=1): Not Available	Vapor Pressure(mmHg): Not Available	Evaporation Rate: Not Available
Boiling Point(° C): Greater than 100°C	Freezing Point(° C): Less than 0°C	pH: 8.5-9.5	Coefficient of Water/Oil Distribution: Not Available

SECTION 4 - FIRE AND EXPLOSION DATA

Flammability: No	If yes, Under which Conditions? Not Applicable	
Means of Extinction: Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
Flashpoint and Method: "Not Applicable	Upper Flammable Lt (% by Volume): Not Applicable	Lower Flammable Lt (% by Volume): Not Applicable
Autoignition Temperature: Not Applicable	Explosion Data - Sensitivity to Impact: No	Explosion Data - Sensitivity to Static discharges: No
Hazardous Combustion Pdts: carbon monoxide, carbon dioxide, aldehydes, nitrogen oxides, sulfur oxides, methyl methacrylate, butyl acrylate, carbone dioxide, methane		

SECTION 5 - REACTIVITY DATA

Chemical Stability: Stable	If Yes, Under which Conditions? Not Applicable
Incompatibility with other substances: Yes	If yes, which ones? Strong Acids Strong Oxidizing agents Strong Bases
Reactivity, and under what conditions? heat, static discharge, ignition sources, generation of dust, nitric acid, dichlorohydrantion, heat, sparks, or other ignition sources	
Hazardous Decomposition Products: oxides of nitrogen, ammonia, aldehydes	

SECTION 6 - TOXICOLOGICAL PROPERTIES

Route of Entry	Skin Contact: Yes	Absorption: Yes	Eye Contact: Yes	Inhalation: Yes	Ingestion: Yes
Effects to Acute exposure to Product: Insufficient Data					
Effects to Chronic exposure to Product: PROPYLENE GLYCOL has been known to cause LACTIC ACIDOSIS.					
Exposure Limits (Value,Units,By) TITANIUM DIOXIDE: 10 mg/m3 ACGIH PROPYLENE GLYCOL: 10 mg/m3 AIHA					
Irritancy (if yes, explain)					
Sensitization (if yes, explain)			Carcinogenicity (if yes, explain) TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
Reproductive Toxicity (if yes, explain)			Teratogenicity (if yes, explain)		
Mutagenicity (if yes, explain) (DNA INHIBITION: SUBCUTANEOUS, MOUSE = 8000 MG/KG.; CYTOGENETIC ANALYSIS: SUBCUTANEOUS, MOUSE = 8000 MG/KG)			Synergistic Products (if yes, explain)		

SECTION 7 - PREVENTIVE MEASURES

Personal Protective Equipment	Gloves: No	Respirator: Yes	Eye: No	Footwear: No	Clothing: No	Other: No
If checked, specify type: Respirator: NIOSH APPROVED						
Engineering controls (specify such as ventilation, enclosed process): Use mechanical ventilation to reduce exposure, ground all equipment and avoid exposure to open flames or sparks.						
Leak and Spill Procedure: Wear adequate protective equipment and eliminate all ignition sources. Contain spill with absorbant material and place in a suitable covered and labeled container for disposal.						
Waste Disposal: Check with Federal, Provincial and local government regulations and requirements for disposal.						
Handling Procedures and Equipment: Use in a well ventilated area. Do not use with incompatible substances and keep away from heat and all ignition sources. Use grounded and non-sparking equipment only.						

Storage Requirements:

Store in a cool, well ventilated area out of direct sunlight. Store away from heat and all ignition sources. Storage facility should be manufactured out of fire resistant materials.

Special Shipping Information:

None Required

SECTION 8 - FIRST AID MEASURES

Inhalation: Remove to fresh air. Get medical help if there is any breathing difficulty.

Ingestion: Do not induce vomiting unless directed by a physician. If conscious and alert, give two glasses of water. Seek medical attention immediately.

Skin Contact: Remove Contaminated clothing (including shoes) and wash before reuse. Flush with large amounts of soap and water. If irritation persists, seek medical attention.

Eye Contact: Flush eyes with large amounts of lukewarm water for 20 minutes, while holding eyelids open or until irritation subsides. If irritation persist, get medical attention.

SECTION 9 - PREPARATION INFORMATION**Prepared by:**

General Paint Technical Dept

Phone:

(604) 253-3131

Preparation Date:

Feb 27, 2012

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PROPANE

Synonyms : Propane HD-5, Propane commercial, Liquefied Petroleum Gas (LPG), C₃H₈, CGSB Propane Grade 1, CGSB Propane Grade 2, odorized propane, stench propane, automotive propane.

Product code : 100139

Manufacturer or supplier's details
Petro-Canada
P.O. Box 2844, 150 - 6th Avenue South-West
Calgary Alberta T2P 3E3
Canada

Emergency telephone number : Suncor Energy: +1 403-296-3000;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : Propane is used as a fuel gas, refrigerant and as a raw material for organic synthesis. It is also used as a laboratory gas. The grade determines the propane content. It is supplied as pressurized liquid in tanks.

Prepared by : Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Gas at room temperature; liquid when stored under pressure.
Colour	colourless
Odour	Propane is an odourless gas. Odourized propane will contain up to 30 g Ethyl Mercaptan per 1000 L of propane.
Hazard Summary	Flammable gas High pressure gas.

Potential Health Effects

Primary Routes of Entry : Eye contact
Inhalation
Skin contact

Inhalation : Inhalation may cause central nervous system effects.
May cause respiratory tract irritation.
Inhalation of vapours may cause drowsiness, headache,

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

dizziness, and disorientation.

Skin : Contact with rapidly expanding gas may cause burns or frostbite.

Eyes : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : Exposure by this route unlikely.

Aggravated Medical Condition : Overexposure may lead to cardiac sensitization.

Carcinogenicity:

IARC

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
propane	74-98-6	90 - 100 %
propylene	115-07-1	1 - 5 %
butane	106-97-8	1 - 2.5 %
ethane	74-84-0	1 - 1.5 %
methane	74-82-8	0.1 - 0.2 %

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash contaminated clothing before reuse.
Seek medical advice.

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

- | | |
|---|---|
| In case of eye contact | : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention. |
| If swallowed | : Not a significant route of exposure. |
| Most important symptoms and effects, both acute and delayed | : First aider needs to protect himself. |

SECTION 5. FIREFIGHTING MEASURES

- | | |
|---|---|
| Suitable extinguishing media | : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable extinguishing media | : No information available. |
| Specific hazards during firefighting | : If the product release cannot be shut off safely, allow the product to burn itself out.
Cool closed containers exposed to fire with water spray. |
| Hazardous combustion products | : Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion. |
| Further information | : Prevent fire extinguishing water from contaminating surface water or the ground water system. |
| Special protective equipment for firefighters | : Wear self-contained breathing apparatus and full protective wear.
Wear a positive-pressure supplied-air respirator with full facepiece. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|--|
| Personal precautions, protective equipment and emergency procedures | : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
In case of inadequate ventilation wear respiratory protection.
Remove all sources of ignition. |
| Environmental precautions | : If the product contaminates rivers and lakes or drains inform respective authorities. |
| Methods and materials for containment and cleaning up | : Prevent further leakage or spillage if safe to do so.
Ensure adequate ventilation.
Use explosion-proof ventilation equipment.
Non-sparking tools should be used.
Contact the proper local authorities. |

SECTION 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid contact with skin, eyes and clothing.
Avoid breathing gas.
Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity.
Use only with adequate ventilation.
Keep away from heat and sources of ignition.
Keep container closed when not in use.
Do not use sparking tools.
Do not enter areas where used or stored until adequately ventilated.
- Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.
Keep away from sources of ignition - No smoking.
Ensure the storage containers are grounded/bonded.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
propane	74-98-6	TWA	1,000 ppm	CA AB OEL
		TWA	1,000 ppm	CA BC OEL
		TWAEV	1,000 ppm 1,800 mg/m ³	CA QC OEL
propylene	115-07-1	TWA	500 ppm 860 mg/m ³	CA AB OEL
		TWA	500 ppm	CA BC OEL
		TWA	500 ppm	ACGIH
butane	106-97-8	TWA	1,000 ppm	CA AB OEL
		TWA	600 ppm	CA BC OEL
		STEL	750 ppm	CA BC OEL
		TWAEV	800 ppm 1,900 mg/m ³	CA QC OEL
ethane	74-84-0	TWA	1,000 ppm	CA AB OEL
		TWA	1,000 ppm	CA BC OEL

- Engineering measures : Use only in well-ventilated areas.
Use explosion-proof ventilation equipment.

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.

Personal protective equipment

- | | |
|-----------------------------|---|
| Respiratory protection | : Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. |
| Filter type | : Always wear NIOSH-approved self-contained breathing apparatus when handling this material. |
| Hand protection
Material | : Wear insulated gloves to prevent frostbite. |
| Remarks | : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. |
| Eye protection | : Wear face-shield and protective suit for abnormal processing problems. |
| Skin and body protection | : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. |
| Protective measures | : Wash contaminated clothing before re-use.
Wear suitable protective equipment. |
| Hygiene measures | : Remove and wash contaminated clothing and gloves, including the inside, before re-use.
Wash face, hands and any exposed skin thoroughly after handling. |

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

- | | |
|-----------------------------|---|
| Appearance | : Gas at room temperature; liquid when stored under pressure. |
| Colour | : colourless |
| Odour | : Propane is an odourless gas. Odourized propane will contain up to 30 g Ethyl Mercaptan per 1000 L of propane. |
| Odour Threshold | : No data available |
| pH | : No data available |
| Pour point | : No data available |
| Boiling point/boiling range | : -42 °C (-44 °F) |
| Flash point | : -104 °C (-155 °F)
Method: closed cup |
| Fire Point | : No data available |

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Auto-Ignition Temperature	: 450 °C (842 °F)
Evaporation rate	: No data available
Flammability	: 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.
Upper explosion limit	: 9.5 %(V)
Lower explosion limit	: 2.1 %(V)
Vapour pressure	: 10,763 mmHg (38 °C / 100 °F)
Relative vapour density	: 1.56
Relative density	: No data available
Density	: No data available
Solubility(ies)	
Water solubility	: No data available
Partition coefficient: n-octanol/water	: No data available
Viscosity	
Viscosity, kinematic	: No data available
Explosive properties	: Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapour explosion hazard indoors, outdoors or in sewers. Propane may form explosive mixtures with air.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	: Heat, flames and sparks.
Incompatible materials	: Reactive with oxidising agents and halogenated compounds.
Hazardous decomposition products	: May release COx, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Eye contact Inhalation
--	-----------------------------

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Skin contact

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

Components:

butane:

Acute inhalation toxicity : LC50 Rat: 658 mg/l
Exposure time: 4 h
Test atmosphere: gas

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

SECTION 12. ECOLOGICAL INFORMATION

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

Components:

butane :

Partition coefficient: n-octanol/water : log Pow: 2.89

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : The product should not be allowed to enter drains, water courses or the soil.
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste must be classified and labelled prior to recycling or disposal.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No. : 1978

Proper shipping name : Propane

Class : 2.1

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Packing group : Not Assigned
Labels : 2.1
Packing instruction (cargo aircraft) : 200

IMDG-Code

UN number : 1978
Proper shipping name : PROPANE
Class : 2.1
Packing group : Not Assigned
Labels : 2.1
EmS Code : F-D, S-U
Marine pollutant : no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

TDG

UN number : 1978
Proper shipping name : PROPANE
Class : 2.1
Packing group : Not Assigned
Labels : 2.1
ERG Code : 115
Marine pollutant : no

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : A: Compressed Gas
B1: Flammable gas

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

The components of this product are reported in the following inventories:

DSL On the inventory, or in compliance with the inventory
TSCA All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

Material Safety Data Sheet

PROPANE

000003000646



Version 1.0

Revision Date 2015/03/30

Print Date 2015/03/30

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Propylene	Trade Name: FG2; Liquified petroleum gas
Product Use: Many.	
Chemical Name: Propylene	Synonym: Propene, methylethene, methylethylene, 1-Propene, 1-Propylene
Chemical Formula: C ₃ H ₆	Chemical Family: Alkenes
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Hazards Identification

Emergency Overview

DANGER! Flammable liquid and gas under pressure. Can form explosive mixtures with air. May cause liver damage. May cause frostbite. May cause anesthetic effects. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. This product is a colourless gas at normal temperature and pressure with a faintly sweet odour.

ROUTES OF EXPOSURE: Inhalation. Skin contact. Eye contact.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headaches, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

SKIN CONTACT: No harm expected from vapour. Liquid may cause frostbite.

SKIN ABSORPTION: No evidence of adverse effects from available information.

SWALLOWING: This product is a gas at normal temperature and pressure.

EYE CONTACT: No harm expected from vapour. Liquid may cause frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

May cause damage to the following organs: liver.

OTHER EFFECTS OF OVEREXPOSURE:

At very high concentrations may produce cardiac arrhythmias or arrest due to sensitization of the heart to adrenalin and nor-adrenalin.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

None currently known.

CARCINOGENICITY:

A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

3. Composition and Information on Ingredients**COMPONENTS****CAS
NUMBER****CONCENTRATION
% by Mole**

Propylene

115-07-1

100

4. First Aid Measures**INHALATION:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

SKIN CONTACT:

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41 C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

Immediately flush eyes with water for a least 15 minutes. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

Do not administer adrenalin due to the sensitizing effect of this material on the myocardium. There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures**FLAMMABLE :** Yes.**IF YES, UNDER WHAT CONDITIONS?**

Not available. Forms explosive mixtures with air and oxidizing agents.

EXTINGUISHING MEDIA:

CO₂, dry chemical, water spray or fog.

PRODUCTS OF COMBUSTION:

These products are carbon oxides (CO, CO₂).

PROTECTION OF FIREFIGHTERS:

DANGER! Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance taking care not to extinguish flames. Remove ignition source if without risk. If flames are accidentally extinguished. Explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Reapproach with extreme caution. Use self-contained breathing apparatus. Stop flow of gas if without risk while continuing cooling water spray. Remove all containers from area if without risk. Allow fire to burn out.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Forms explosive mixture with air and oxidizing agents. Container may rupture due to heat of fire. Do not extinguish flames due to possibility of explosive re-ignition. Flammable vapours may spread from spill. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with appropriate device. No part of a container should be subjected to a temperature higher than 52 C. Vapours form from this product may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharges, or other ignition sources at locations distant from product handling point. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Possible, ground all containers.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: 2

UPPER: 11.1

FLASH POINT:

CLOSED CUP: -107.8°C (-162°F).
(Tag.)

AUTOIGNITION TEMPERATURE:

460°C (860°F)

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**Personal Precautions:**

DANGER! Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool containers with water spray from maximum distance taking care not to extinguish flames. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive re-ignition may occur; therefore, appropriate measures should be taken; e.g., total evacuation. Re-approach with extreme caution. Reduce corrosive vapours with water spray or fog. Stop flow of gas if without risk while continuing water spray. Remove all containers from area if without risk. Allow fire to burn out.

Environmental Precautions:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Flammable liquid and gas under pressure. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only spark-proof tools and explosion-proof equipment. Keep away from heat, sparks, and open flame. **May form explosive mixtures with air.** Ground all equipment. Store and use with adequate ventilation at all times. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier, be sure valve is closed, then install valve outlet plug tightly. Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Propylene	115-07-1	Not available.	Not available.	500ppm

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):

VENTILATION/ENGINEERING CONTROLS:

- LOCAL EXHAUST:** An explosion-proof local exhaust system is acceptable. Use a local exhaust system, if necessary, to prevent oxygen deficiency and keep hazardous fumes and gases below all applicable exposure limits in the worker's breathing zone.
- MECHANICAL (General):** Under certain conditions, general exhaust ventilation may be acceptable to maintain an adequate supply of oxygen and keep component concentrations below the TLV's in the worker's breathing zone.
- SPECIAL:** None.

OTHER: None.**PERSONAL PROTECTION:**

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Wear work gloves when handling cylinders.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Gas. (Compressed Gas.)	FREEZING POINT: -185.25°C (-301.4°F)	pH: Not applicable.
BOILING POINT -47.72°C (-53.9°F)	VAPOUR PRESSURE 915.69 kPa (@ 20°C)	MOLECULAR WEIGHT: 42.081 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) 0.52 @ 20 C	SOLUBILITY IN WATER, Negligible.	
SPECIFIC GRAVITY: VAPOUR (air = 1) 1.45 g/ml @ 21.1 C	EVAPORATION RATE (Butyl Acetate=1): > 1 compared to (Butyl Acetate = 1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.00177 g/ml @ 21.1 C	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Not available.

APPEARANCE & ODOUR: Colourless. Odour: Faintly sweet.

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	None known.
INCOMPATIBILITY (materials to avoid):	Oxidizing agents, halogens and acids.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	Thermal decomposition or burning may produce CO/CO ₂ . The welding & cutting process may form reaction products such as CO/CO ₂ .
CONDITIONS OF REACTIVITY:	Elevated temperatures and pressures and/or presence of a catalyst.

11. Toxicological Information

ACUTE DOSE EFFECTS: The welding process may generate hazardous fumes and gases. See Sections 8, 10, 15 and 16 for additional information.

STUDY RESULTS:

None known.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Propylene (or Liquified Petroleum Gases)

HAZARD CLASS:	CLASS 2.1: Flammable gas.	IDENTIFICATION #: UN1077 (or 1075 if using the shipping name Liquified Petroleum Gas)	PRODUCT REPORTABLE QUANTITY (PRQ): Any accidental release in any quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.
----------------------	------------------------------	--	---

SHIPPING LABEL(s): Flammable gas

PLACARD (When Required): Flammable gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS (Canada): CLASS A: Compressed gas.
CLASS B-1: Flammable gas.

This product is on the DSL list.

International Regulations:

EINECS: Not available.

DSCL (EEC): This product is not classified according to the EU regulations.

International Lists: No products were found.

16. Other Information**MIXTURES:**

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:**HMIS RATINGS:**

HEALTH 1

FLAMMABILITY 4

PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:**THREADED:** CGA-510**PIN-INDEXED YOKE:** None.**ULTRA-HIGH-INTEGRITY
CONNECTION:** None.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1	Safe Handling and Storage of Compressed Gas
P-1	Safe Handling of Compressed Gases in Containers
P-14	Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres
SB-2	Oxygen-Deficient Atmospheres
V-1	Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7	Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
---	Handbook of Compressed Gases, Fifth Edition

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

PREPARATION INFORMATION:**DATE:** October 15, 2013**DEPARTMENT:** Safety and Environmental Services**TELEPHONE:** 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Product Name: Propylene

MSDS# E-4648-N

Date: Oct. 15, 2013

Praxair and the *Flowing Airstream* design are trademarks of
Praxair Canada Inc.

Other trademarks used herein are trademarks or registered trademarks of their respective owners.



Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2



Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 24-Nov-2010

Revision Date 06-Jul-2014

Revision Number 1

1. Identification

Product Name Sodium Persulfate

Cat No. : BP26371, O61141, 06114500

Synonyms Sodium peroxydisulfate

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing solids	Category 3
Acute oral toxicity	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Danger

Hazard Statements

May intensify fire; oxidizer
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause respiratory irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles

Inhalation

If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sodium persulfate	7775-27-1	>95

4. First-aid measures

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion

Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects	May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Flooding quantities of water.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Oxidizing Properties	Oxidizer
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Oxidizer: Contact with combustible/organic material may cause fire. Containers may explode when heated or if contaminated with water. Decomposes violently at elevated temperatures. May ignite combustibles (wood paper, oil, clothing, etc.).

Hazardous Combustion Products

Sulfur oxides.

Sulfur oxides oxygen

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
2

Flammability
2

Instability
2

Physical hazards
OX

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing.
Environmental Precautions	See Section 12 for additional ecological information.
Methods for Containment and Clean Up	Keep combustibles (wood, paper, oil, etc) away from spilled material. Avoid dust formation. Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Use only with adequate ventilation. Keep away from clothing and other combustible materials. Avoid dust formation. Avoid contact with skin and eyes. Do not breathe dust. Do not ingest. Keep containers dry and tightly closed to avoid moisture absorption and contamination.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near combustible materials. Keep away from acids. Protect from moisture.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium persulfate	TWA: 0.1 mg/m ³		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Sodium persulfate			TWA: 0.1 mg/m ³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	5 - 7 550 g/l H ₂ O
Melting Point/Range	100 °C / 212 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Relative Density	2.6
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	180 °C
Viscosity	Not applicable
Molecular Formula	Na ₂ O ₈ S ₂
Molecular Weight	238.09

10. Stability and reactivity

Reactive Hazard Yes

Stability Oxidizer: Contact with combustible/organic material may cause fire. Hygroscopic.

Conditions to Avoid	Incompatible products. Excess heat. Avoid dust formation. Exposure to moisture. Combustible material.
Incompatible Materials	Strong oxidizing agents, Acids, Strong reducing agents, Combustible material
Hazardous Decomposition Products	Sulfur oxides, oxygen
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium persulfate	895 mg/kg (Rat)	10000 mg/kg (Rabbit)	21.6 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Irritating to eyes, respiratory system and skin
Sensitization	No information available May cause sensitization by inhalation and skin contact
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium persulfate	7775-27-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium persulfate	Not listed	771 mg/L LC50 96 h	Not listed	133 mg/L EC50 = 48 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1505
 Proper Shipping Name SODIUM PERSULFATE
 Hazard Class 5.1
 Packing Group III

TDG

UN-No UN1505
 Proper Shipping Name SODIUM PERSULFATE
 Hazard Class 5.1
 Packing Group III

IATA

UN-No 1505
 Proper Shipping Name SODIUM PERSULPHATE
 Hazard Class 5.1
 Packing Group III

IMDG/IMO

UN-No 1505
 Proper Shipping Name SODIUM PERSULPHATE
 Hazard Class 5.1
 Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium persulfate	X	X	-	231-892-1	-		X	X	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard Yes
 Chronic Health Hazard No
 Fire Hazard No
 Sudden Release of Pressure Hazard No

Reactive Hazard

Yes

Clean Water Act Not applicable**Clean Air Act** Not applicable**OSHA** Occupational Safety and Health Administration
Not applicable**CERCLA**
Not applicable**California Proposition 65** This product does not contain any Proposition 65 chemicals**State Right-to-Know**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium persulfate	-	X	-	-	-

U.S. Department of TransportationReportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N**U.S. Department of Homeland Security**

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade** No information available**Canada**

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

WHMIS Hazard Class C Oxidizing materials
D1B Toxic materials
D2A Very toxic materials
D2B Toxic materials**16. Other information****Prepared By** Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com**Creation Date** 24-Nov-2010
Revision Date 06-Jul-2014
Print Date 06-Jul-2014**Revision Summary** This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)**Disclaimer**

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Varsol

SECTION 1. IDENTIFICATION

Product Identifier	Varsol
Other Means of Identification	13-371, 13-374, 13-374HD, 13-375, 23-379, 23-379-M, 33-371H, 33-374H, 33-375H
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	1569

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid - Category 3; Acute toxicity (Inhalation) - Category 3; Skin corrosion/irritation - Category 2; Serious eye damage/eye irritation - Category 2A; Germ cell mutagenicity - Category 1B; Carcinogenicity - Category 1B; Specific target organ toxicity (single exposure) - Category 3; Aspiration hazard - Category 1; Aquatic hazard (Chronic) - Category 2

GHS Label Elements



Signal Word:
Danger

Hazard Statement(s):

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statement(s):

Prevention:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, sparks, open flames, and hot surfaces. – No smoking.

P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical, ventilating, lighting, and other equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing fume, mist, vapours, spray.
P264 Wash hands and skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/eye protection/face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P331 Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P370 + P378 In case of fire: Use appropriate foam, carbon dioxide, water spray or fog, dry chemical powder to extinguish.
P391 Collect spillage.

Storage:

Store in a well ventilated place. Keep cool. Keep container tightly closed. Store locked up.

Disposal:

Dispose of contents/container in accordance with applicable regional, national and local laws and regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Stoddard solvent	8052-41-3	60-100	
n-Nonane	111-84-2	1-5	
1,2,4-Trimethylbenzene	95-63-6	1-5	
Naphthalene	91-20-3	0.1-1	

Notes

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Product Identifier: Varsol
SDS No.: 1569
Date of Preparation: October 13, 2015

Inhalation

Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. Call a Poison Centre or doctor if you feel unwell or are concerned.

Skin Contact

Avoid direct contact. Wear chemical protective clothing if necessary. Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes. Call a Poison Centre or doctor if you feel unwell or are concerned. If skin irritation occurs get medical advice/attention. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Avoid direct contact. Wear chemical protective gloves if necessary. Quickly and gently blot or brush chemical off the face. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Take care not to rinse contaminated water into the unaffected eye or onto the face. If eye irritation persists, get medical advice/attention.

Ingestion

Do not induce vomiting. Rinse mouth with water. Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. If vomiting occurs naturally, lie on your side in the recovery position. Rinse mouth with water again. If breathing has stopped, trained personnel should immediately begin rescue breathing. Immediately call a Poison Centre or doctor.

Most Important Symptoms and Effects, Acute and Delayed

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Immediate Medical Attention and Special Treatment

Target Organs

Eyes, skin, respiratory system.

Special Instructions

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Medical Conditions Aggravated by Exposure

Dermatitis.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Chemical

Flammable liquid and vapour. Can ignite at room temperature. Releases vapour that can form explosive mixture with air. Can be ignited by static discharge. Can accumulate static charge by flow, splashing or agitation. Liquid can float on water and may travel to distant locations and/or spread fire. See Section 9 (Physical and Chemical Properties) for flash point and explosive limits. Closed containers may rupture violently when heated releasing contents.

In a fire, the following hazardous materials may be generated: irritating chemicals; toxic chemicals; very toxic carbon monoxide, carbon dioxide.

Special Protective Equipment and Precautions for Fire-fighters

Review Section 6 (Accidental Release Measures) for important information on responding to leaks/spills.

See Skin Protection in Section 8 (Exposure Controls/Personal Protection) for advice on suitable chemical protective materials.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

No special precautions are necessary. Evacuate downwind locations. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Increase ventilation to area or move leaking container to a well-ventilated and secure area. Eliminate all ignition sources. Use grounded, explosion-proof equipment.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Conditions for Safe Storage

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Stoddard solvent	100 ppm	Not established	100 ppm	Not established		
Naphthalene	10 ppm A3	Not established	10 ppm	15 ppm		
n-Nonane	200 ppm	Not established	200 ppm	Not established		
1,2,4-Trimethylbenzene	25 ppm	Not established	25 ppm	Not established		

Appropriate Engineering Controls

General ventilation is usually adequate. For large scale use of this product: use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof

Product Identifier: Varsol

SDS No.: 1569

Date of Preparation: October 13, 2015

equipment and intrinsically safe electrical systems in areas where this product is used and stored. Control static electricity discharges which includes bonding of equipment to ground. Use only non-combustible, compatible materials for walls, floors, ventilation system, air cleaning devices, pallets, shelving. Provide eyewash and safety shower if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles.

Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.

Respiratory Protection

Not normally required if product is used as directed. For non-routine or emergency situations: wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Clear liquid.
Odour	Hydrocarbon
Odour Threshold	Not available
pH	Not available
Melting Point/Freezing Point	-76 °C (-105 °F) (melting); -76 °C (-105 °F) (freezing)
Initial Boiling Point/Range	159 - 195 °C (318 - 383 °F)
Flash Point	43 °C (109 °F) (closed cup)
Evaporation Rate	0.1 (n-butyl acetate = 1)
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	5.6% (upper); 0.8% (lower)
Vapour Pressure	3.98 - 4.50 mm Hg (0.53 - 0.60 kPa) at 25 °C
Vapour Density (air = 1)	5
Relative Density (water = 1)	0.788 at 15 °C
Solubility	Insoluble in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	260 °C (500 °F)
Decomposition Temperature	Not available
Viscosity	1.21 centistokes at 25 °C (kinematic); Not available (dynamic)
Other Information	
Physical State	Liquid
Molecular Weight	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity

None known.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None known.

Conditions to Avoid

Product Identifier:	Varsol
SDS No.:	1569
Date of Preparation:	October 13, 2015

Open flames, sparks, static discharge, heat and other ignition sources. Temperatures above 43.0 °C (109.4 °F)

Incompatible Materials

Reacts explosively with: strong oxidizing agents (e.g. perchloric acid).

Not corrosive to metals.

Hazardous Decomposition Products

None known.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; eye contact; inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Stoddard solvent	> 5500 mg/m ³ (rat) (4-hour exposure)	5000 mg/kg (rat)	> 3000 mg/kg (rabbit)
Naphthalene	739.2 mg/m ³ (rat) (4-hour exposure)	316 mg/kg (mouse)	> 20000 mg/kg (rabbit)
n-Nonane	3200 ppm (rat) (4-hour exposure)	15 g/kg (rat)	Not available
1,2,4-Trimethylbenzene	18000 mg/m ³ (rat)	5000 mg/kg (rat)	Not available

LC50: Not applicable.

LD50 (oral): Not applicable.

LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

Animal tests show moderate or severe irritation.

Serious Eye Damage/Irritation

Human experience shows mild irritation. The vapour also irritates the eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. Nose and throat irritation. At high concentrations.

Skin Absorption

No information was located.

Ingestion

Not harmful based on animal tests.

Aspiration Hazard

Can cause lung damage if aspirated based on human experience. Death can result.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Causes damage to organs based on studies in people. If inhaled: effects similar to STOT (Specific Target Organ Toxicity) - Single Exposure, as described above, effects on the central nervous system, "organic solvent syndrome".

Causes Following skin contact: dermatitis. Symptoms may include dry, red, cracked skin (dermatitis). effects similar to STOT (Specific Target Organ Toxicity) - Single Exposure, as described above.

May cause damage to organs based on limited evidence. If inhaled and/or following skin contact: at high concentrations harmful effects on the kidneys, harmful effects on the liver.

May cause damage to organs based on limited evidence. If inhaled and/or following skin contact: blood tests may show abnormal results.

Respiratory and/or Skin Sensitization

No information was located. No information was located.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Stoddard solvent	Group 3	Not designated	Not Listed	Not Listed
Naphthalene	Group 2B	A3	Reasonably anticipated	Not Listed
n-Nonane	Not Listed	Not designated	Not Listed	Not Listed
1,2,4-Trimethylbenzene	Not Listed	Not designated	Not Listed	Not Listed

Reproductive Toxicity

Development of Offspring

Conclusions cannot be drawn from the limited studies available.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

May be mutagenic based on limited evidence. (Stoddard solvent)

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Stoddard solvent	Not available	Not available		
Naphthalene	0.9-9.8 mg/L (Oncorhynchus mykiss (rainbow trout); 96-hour; fresh water)	Not available		
n-Nonane	Not available	Not available		
1,2,4-Trimethylbenzene	7.72 mg/L (Pimephales promelas (fathead	Not available		

Product Identifier: Varsol

SDS No.: 1569

Date of Preparation: October 13, 2015

	minnow); 96-hour)			
--	-------------------	--	--	--

Chronic Aquatic Toxicity

Chemical Name	NOEC Fish	EC50 Fish	NOEC Crustacea	EC50 Crustacea
Stoddard solvent	Not available		Not available	
Naphthalene	1.8 mg/L (Oncorhynchus mykiss (rainbow trout); 3 days; fresh water)		Not available	
n-Nonane	Not available		Not available	
1,2,4-Trimethylbenzene	Not available		Not available	

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
Canadian TDG	1268	PETROLEUM DISTILLATES	3	III
US DOT	1268	PETROLEUM DISTILLATES	3	III

Environmental Hazards Potential Marine Pollutant (1,2,4-Trimethylbenzene)

Special Precautions for User Please note: In containers of 450 L or less this product is not classified as a Dangerous Good according to TDG Exemption 1.33
In containers of 450L or less, this product meets the requirements of DOT exemption as per 49 CFR, section 173.150 (f).

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Product Identifier: Varsol
SDS No.: 1569
Date of Preparation: October 13, 2015

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

California Proposition 65: WARNING: This product contains chemicals known to the State of California to cause cancer.

SECTION 16. OTHER INFORMATION

SDS Prepared By Compliance and Regulatory Department

Phone No. 905-878-5544

Date of Preparation October 13, 2015

Additional Information We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative.
Please send us your request by visiting our website at www.recochem.com.

Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.

Disclaimer Notice to reader: 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.

Product Identifier: Varsol

SDS No.: 1569

Page 09 of 09

Date of Preparation: October 13, 2015

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: VOLTESSO 35
Product Description: Base Oil and Additives
MSDS Number: 8145
Intended Use: Electrical insulating oils

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 1-519-339-2145
Distributor General Contact 1-877-243-1934
1-403-243-1934

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

If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs.
Frequent or prolonged contact may de-fat and dry the skin, leading to discomfort and dermatitis.

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. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

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

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

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, Sulphur Oxides, Aldehydes, Oxides of carbon, incomplete combustion products

FLAMMABILITY PROPERTIES

Flash Point [Method]: >145C (293F) [ASTM D-93]

Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D

Auto ignition 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.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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

Avoid contact with skin. 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/vapor 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. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical-resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

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:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

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. Practice 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: pale yellow
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.881
Flash Point [Method]: >145C (293F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Auto ignition Temperature: N/D
Boiling Point / Range: > 271C (520F)
Vapor Density (Air = 1): N/D
Vapor Pressure: [N/D 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: 8 cSt (8 mm²/sec) at 40 °C
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
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/m ³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
INGESTION	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 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

For the product itself:

Prolonged and/or repeated skin contact with low viscosity materials may deflate the skin resulting in possible irritation and dermatitis. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

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 sensitizing 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 (where applicable): Empty containers may retain residue and can be dangerous. 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. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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: DSL, TSCA

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:

No revision information is available.

WHMIS Classification: Not controlled

The information and recommendations contained herein are, to the best of Imperial Oil's knowledge and belief, accurate and reliable as of the date issued. Imperial Oil assumes no responsibility for accuracy of information unless the document is the most current available from an official Imperial Oil distribution system. The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted.

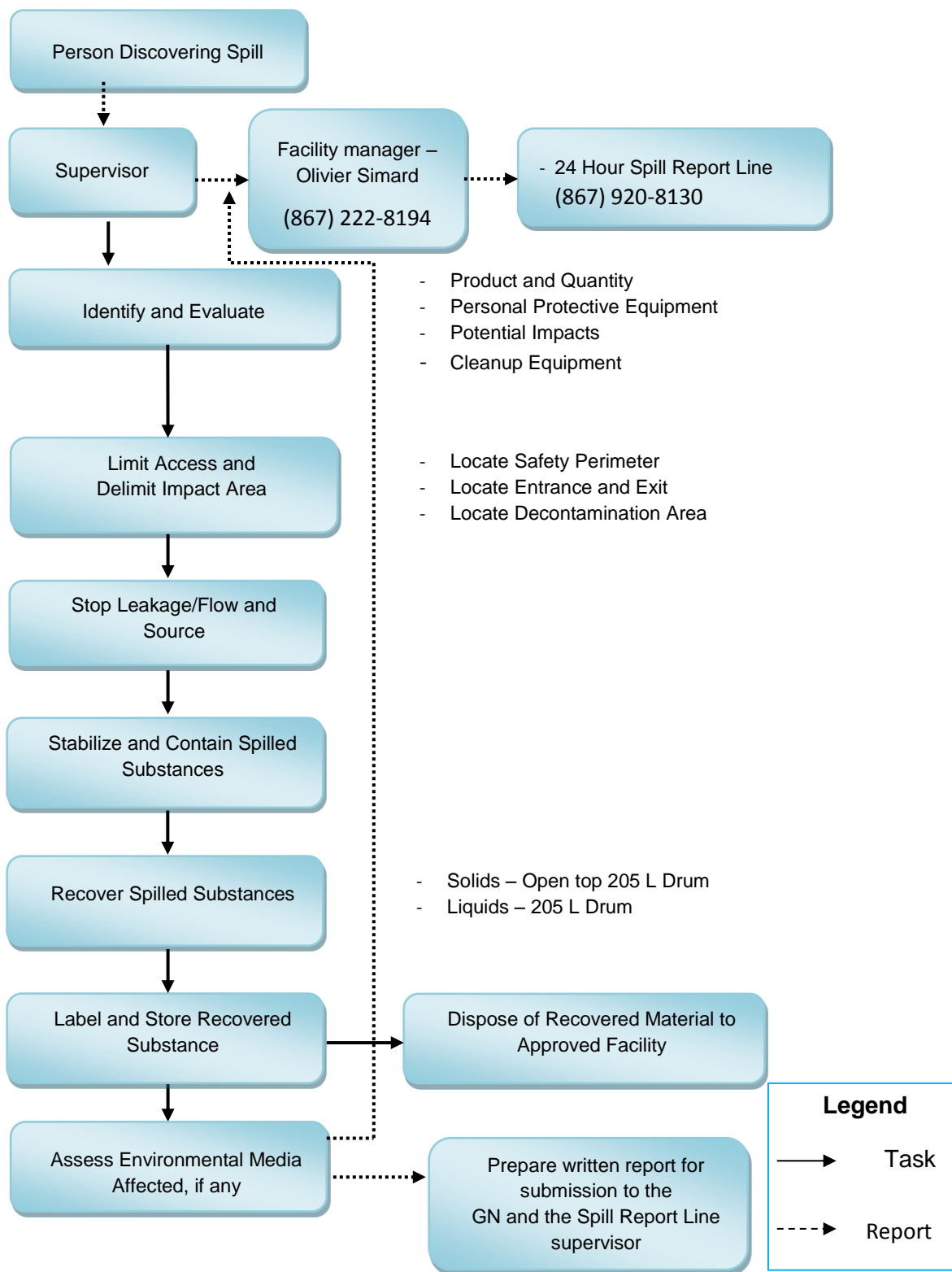
DGN: 5007051 (1013422)

Prepared By: Imperial Oil Limited, IH and Product Safety

APPENDIX B

SPILL RESPONSE FLOWCHART

Spill Response



APPENDIX C

STANDARD NUNAVUT SPILL REPORT FORM

