

## **APPENDIX M**

### **ABANDONMENT AND REMEDIATION**



## **1. INTRODUCTION**

In August 2014, Qikiqtaaluk Environmental (QE) obtained a Water Licence for the operation of a water treatment system in Iqaluit. The system manages and treats hydrocarbon impacted water, typically resulting from spills and fuel tank clean-up activities. When spills occur while snow is still present, impacted snow and ice must be containerized and properly stored, treated only once it has melted, and then discharged. Snow and water during spills must be properly managed and removed from the environment to minimize additional impacts to the soils.

A Water Licence Amendment Application and Nunavut Impact Review Board (NIRB) application are submitted to address additional activities to be undertaken at the facility in Iqaluit. These additional activities include an increase in the types of contaminants to be removed from impacted water, the construction of a water holding pond and the addition of a hydrocarbon impacted soil treatment facility. The present abandonment and restoration plan will also include any waste stored on-site to be shipped south for disposal.

## **2. ABANDONMENT AND REMEDIATION PLAN OBJECTIVES**

The general abandonment and remediation goals of this plan are to:

- Ensure the long-term physical and chemical stability of the project area(s) so as to protect the public's health and safety;
- Enhance natural recovery of the disturbed area(s) to a state that is compatible with original conditions to allow for future use by people and wildlife;
- Ensure that the requirement for long-term maintenance and monitoring is minimized.

The purpose of the present Abandonment and Remediation (AR) Plan is to address all project-related activities.

## **3. PROJECT DESCRIPTION**

An application for a Water Licence Amendment and NIRB Application are being submitted for the additional activities, which QE anticipates implementing as soon as the Amended License(s) are granted.

### 3.1 Water Treatment

The water treatment system will continue to be powered by electricity. Petroleum products recovered from water treatment are incinerated in a waste oil furnace or placed in drums, labelled and shipped to an authorized disposal facility in southern Quebec. The treated water effluent is tested for water quality parameters and disposed of at a pre-approved discharge location, following compliance with discharge criteria.

### 3.2 Soil Treatment

Petroleum hydrocarbon contaminated soils will be treated on-site using biological, chemical, and physical treatment techniques.

Contaminated soils will be temporarily stockpiled in a lined and bermed processing area. The processing area will also be used for the physical treatment of soils and will involve soil screening, to remove coarse materials, followed by washing of the screening rejects. Water from the washing process will be redirected to the water treatment facility.

Contaminated soils will be treated using biological degradation methods (landfarming or biopiles) in a lined and bermed treatment area. Biotreatment is effective for the elimination of PHC F1<sup>1</sup> and PHC F2<sup>2</sup> and to a lesser degree PHC F3<sup>3</sup>. Soil treatment by chemical oxidation using an oxygen source (e.g., hydrogen peroxide solution, sodium persulfate, sodium percarbonate) may also be carried out in the treatment area. Treatment by chemical oxidation is effective for the elimination of PHC F3.

### 3.3 Hazardous Waste Management

Hazardous waste management activities conducted at the waste transfer station include:

- Waste identification, segregation and consolidation;
- Volume reduction;
- Waste packaging and labelling;
- Temporary safe storage inside marine containers.

Annually, stored waste containers are shipped south to an authorized facility for final disposal.

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1. Petroleum hydrocarbon Fraction 1 (C<sub>6</sub> to C<sub>10</sub>)  
2. Petroleum hydrocarbon Fraction 2 (> C<sub>10</sub> to C<sub>16</sub>)  
3. Petroleum hydrocarbon Fraction 3 (> C<sub>16</sub> to C<sub>34</sub>)

## **4. FINAL ABANDONMENT**

Should QE's treatment systems no longer be functional or in the event QE decides to cease these activities and/or withdraw from this market, the water and soil treatment systems will be dismantled and removed from the site.

Any spent water treatment filtration media will be containerized and shipped south for disposal in an authorized facility. If any untreated water or soils remain once the activities are ceased, they will be transferred into drums or larger containers, and shipped south for disposal in an authorized facility.

Upon final abandonment, soils at the following locations will be sampled and analyzed to assess quality and determine management options:

- Treated water discharge point;
- Area beneath the impacted soils storage and processing area;
- Area beneath the soil treatment area;
- Hazardous waste storage and processing areas;
- Sediments at the bottom of the water holding ponds.

The sediments at the bottom of the water holding ponds will be sampled and analyzed. If contaminated soils or sediments are present, they will be excavated, containerized and shipped south for disposal at an authorized facility.

All stored hazardous waste containers will be shipped south to an authorized facility for final disposal. The empty hazardous waste storage containers will be cleaned, and, if required, decontaminated prior to removal from the site.

All other structures, including trailers and containers, will also be removed from the site.

## **5. MONITORING**

Once activities on the site have ceased and all stored waste, contaminated water and contaminated soils have been removed from the site, no further monitoring will be carried out, as there will no longer be a source of contamination on the site.

## **APPENDIX N**

### **SPILL CONTINGENCY PLAN**

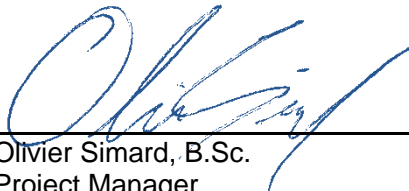
**24-hours  
Qikiqtaaluk Environmental Inc.  
Contact:  
867-222-8194**

## **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**

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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, 2<sup>nd</sup> 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  
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## 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 CCME<sup>1</sup>:
    - 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.

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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 <sup>3</sup>	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 yd<sup>3</sup> (approximately 750 L) capacity  
Waste wranglers (Quatex™ bags) are assumed to be 1 yd<sup>3</sup> (approximately 750 L) capacity  
Battery packs are assumed to be 0.5 yd<sup>3</sup> (approximately 380 L) capacity

The largest single storage container used for TDG<sup>1</sup> 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 m<sup>3</sup> waste wranglers made of woven polypropylene with reinforced sides and 6 mil inner liner;
- 0.75 m<sup>3</sup> bulk bags made of woven polypropylene with a 6 mil inner liner;
- 3.75 m<sup>3</sup> 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).

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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
<b>Olivier Simard</b> EWPF Manager	Cell: 867 222-8194 <b>(24 hrs)</b>
<b>Benoit Dion</b> EWPF Director	Office Tel: 514-940-3332 Cell: 514-718-1230 <b>(24 hrs)</b>
<b>On-Duty Environmental Technician</b> Hazmat Specialist	Cell: 867 222-3246
<b>Harry Flaherty</b> 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:

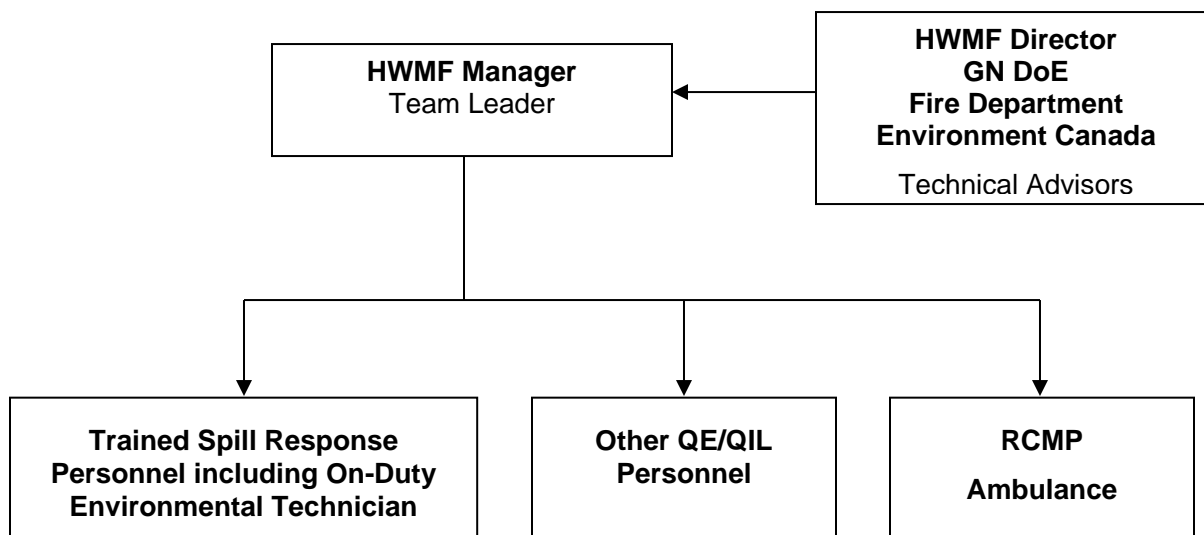
- Report the spill to NT-NU 24 hour Spill Report Line at 867 920-8130;
- Act as a liaison with Management to keep them informed of clean-up activities;
- Obtain additional required resources not available on-site for spill response and clean-up;
- Act as the spokesperson with government agencies as well 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 TDGRs<sup>1</sup> (i.e., TDGR-Clear language, IMDG<sup>2</sup>, IATA<sup>3</sup>).

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;
- PPE<sup>1</sup> 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.

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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
<b>Q Ultra 75 Hydrophobic 140 gallon capacity</b>	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™



# 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: B-2 D-2B		TDG CLASS: 3 PIN: UN1090 PG: II
 	   	

## Section I. Product Identification and Uses

<b>Product name</b>	<b>ACETONE</b>	<b>CI#</b>	Not available.
<b>Chemical formula</b>	CH <sub>3</sub> COCH <sub>3</sub>	<b>CAS#</b>	67-64-1
<b>Synonyms</b>	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	<b>Code</b>	AC-0150
<b>Supplier</b>	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	<b>Formula weight</b>	58.08
		<b>Supersedes</b>	
<b>Material uses</b>	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 <sup>3</sup> ); STEL 750 ppm (1780 mg/m <sup>3</sup> )

### Toxicity values of the hazardous ingredients

#### ACETONE:

ORAL (LD<sub>50</sub>): Acute: 3000 mg/kg (Mouse). 5800 mg/kg (Rat). 5340 mg/kg (Rabbit).

VAPOR (LC<sub>50</sub>): Acute: 50100 mg/m<sup>3</sup> (Rat) (8 hour(s)). 44000 mg/m<sup>3</sup> (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 <sub>2</sub> ).
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

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**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

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CDN

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**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

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Trade name: Acetylene

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## 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.

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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**

<b>Form:</b>	Gaseous.
<b>Color:</b>	Colorless
<b>Odor:</b>	Ether-like

**Change in condition**

<b>Melting point/Melting range:</b>	-80.8°C
<b>Boiling point/Boiling range:</b>	-83°C

<b>Flash point:</b>	< 0°C Not applicable.
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<b>Flammability (solid, gaseous):</b>	Highly flammable.
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<b>Ignition temperature:</b>	325°C
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<b>Danger of explosion:</b>	Heating may cause an explosion. In use, may form flammable/explosive vapour-air mixture.
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<b>Explosion limits:</b>	
<b>Lower:</b>	2.3 Vol %
<b>Upper:</b>	78> Vol %

<b>Solubility in / Miscibility with Water at 20°C:</b>	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.

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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

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CDN

## Material Safety Data Sheet

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Trade name: Acetylene

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

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## \* 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 &amp; 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)



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## 2. Hazards identification

<b>General</b>	: Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.
<b>Prevention</b>	: 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.
<b>Response</b>	: 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.
<b>Storage</b>	: 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.
<b>Disposal</b>	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
<b>Supplemental label elements</b>	: None known.
<b>Hazards not otherwise classified</b>	: None known.

## 3. Composition/information on ingredients

**Substance/mixture** : Mixture

<b>Ingredient name</b>	<b>%</b>	<b>CAS number</b>
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

<b>Eye contact</b>	: 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.
<b>Inhalation</b>	: 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.

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## 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	<b>ACGIH TLV (United States, 6/2013).</b> C: 2 mg/m <sup>3</sup> <b>OSHA PEL 1989 (United States, 3/1989).</b> CEIL: 2 mg/m <sup>3</sup> <b>NIOSH REL (United States, 10/2013).</b> CEIL: 2 mg/m <sup>3</sup> <b>OSHA PEL (United States, 2/2013).</b> TWA: 2 mg/m <sup>3</sup> 8 hours.
2-(2-butoxyethoxy)ethanol	<b>ACGIH TLV (United States, 6/2013).</b> TWA: 10 ppm 8 hours. Form: Inhalable fraction and vapor
2-aminoethanol	<b>ACGIH TLV (United States, 6/2013).</b> TWA: 3 ppm 8 hours. TWA: 7.5 mg/m <sup>3</sup> 8 hours. STEL: 6 ppm 15 minutes. STEL: 15 mg/m <sup>3</sup> 15 minutes. <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 3 ppm 8 hours. TWA: 8 mg/m <sup>3</sup> 8 hours. STEL: 6 ppm 15 minutes.

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## 8. Exposure controls/personal protection

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

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## 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.

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# 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	-
2-(2-butoxyethoxy)ethanol	Skin - Severe irritant	Rabbit	-	24 hours 500 milligrams	-
	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.



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## 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



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## 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 <sub>ow</sub>	BCF	Potential
2-(2-butoxyethoxy)ethanol 2-aminoethanol	1	-	low
	-1.31	-	low

### Mobility in soil

Soil/water partition coefficient (K<sub>oc</sub>) : 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

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## 14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
<b>DOT Classification</b>	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
<b>TDG Classification</b>	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
<b>Mexico Classification</b>	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
<b>IMDG Class</b>	UN1950	Aerosols, flammable	2.1 (8)	-		<u>Limited quantity</u>
<b>IATA-DGR Class</b>	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**

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## 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	%
<b>Form R - Reporting requirements</b>	2-(2-butoxyethoxy)ethanol	112-34-5	4.75
<b>Supplier notification</b>	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.

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## 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.)**



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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

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**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

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

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

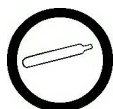
Linde Canada Limited	Linde
5860 Chedworth Way	575 Mountain Avenue
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974
Telephone (905) 501-1700	Telephone (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER:	24-HOUR EMERGENCY TELEPHONE NUMBER
: (905) 501-0802	CHEMTREC (800) 424-9300 OR
	Linde National Operations 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)**



- **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.

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Trade name: Argon

· GHS label elements Void

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## 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

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Trade name: Argon

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## 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

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**Trade name: Argon**

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- **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

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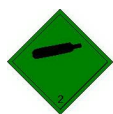
Reviewed on 10/02/2014

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 &amp; 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.

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Printing date 10/02/2014

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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**

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

**2. HAZARD(S) IDENTIFICATION**

<b>Physical hazards</b>	Corrosive to metals	Category 1
<b>Health hazards</b>	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
<b>Environmental hazards</b>	Not currently regulated by OSHA, refer to Section 12 for additional information.	
<b>OSHA defined hazards</b>	This mixture does not meet the classification criteria according to OSHA HazCom 2012.	

**Label elements**

<b>Signal word</b>	Danger
<b>Hazard statement</b>	May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. May cause respiratory irritation.
<b>Precautionary statement</b>	
<b>Prevention</b>	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.
<b>Response</b>	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.
<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant container with a resistant inner liner.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Hazard(s) not otherwise classified (HNOC)</b>	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.
<b>Supplemental information</b>	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 (CO<sub>2</sub>).

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 <sup>3</sup>

**US. NIOSH: Pocket Guide to Chemical Hazards**

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

**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**

<b>Appearance</b>	Clear to white/light gray, viscous liquid
<b>Physical state</b>	Liquid
<b>Form</b>	Viscous liquid
<b>Color</b>	Clear to white/light gray
<b>Odor</b>	Odorless.
<b>Odor threshold</b>	Not Available
<b>pH</b>	> 14 (at high alkali concentration in water pH scale is not applicable)
<b>Melting point/freezing point</b>	39.2 °F (4 °C) (50% solution) -22 °F (-30 °C) (45% solution)
<b>Initial boiling point and boiling range</b>	269.6 °F (132 °C) (45% solution) 289.4 °F (143 °C) (50% solution)
<b>Flash point</b>	Not Applicable (does not burn)
<b>Evaporation rate</b>	Not Available
<b>Flammability (solid, gas)</b>	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/cm<sup>3</sup> @ 15.6°C / 60°F (45% solution)1.516 g/cm<sup>3</sup> @ 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)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2520 mg/kg
<i>Oral</i>		
LD50	Rat	410 mg/kg
<b>Components</b>	<b>Species</b>	<b>Test Results</b>
Potassium Hydroxide (CAS 1310 58-3)		
<b>Acute</b>		
<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)		
<b>Acute</b>		
<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**

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

**IATA**

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

**IMDG**

<b>UN number</b>	UN1814
<b>UN proper shipping name</b>	Potassium hydroxide solution
<b>Transport hazard class(es)</b>	
<b>Class</b>	8
<b>Subsidiary risk</b>	None
<b>Packing group</b>	II
<b>Environmental hazards</b>	
<b>Marine pollutant</b>	No.
<b>EmS</b>	F-A, S-B
<b>Special precautions for user</b>	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

<b>Issue date</b>	03-06-2015
<b>Version #</b>	0
<b>Revision Indicator</b>	<b>New safety data sheet.</b>
<b>List of abbreviations</b>	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  
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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

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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

<b>INGREDIENTS (Chemical/Common Names):</b>	<b>CAS No.:</b>	<b>% by Wt:</b>	<b>EC No.:</b>
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.

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**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)

0.05 mg/m<sup>3</sup>

Sulfuric acid

1.00 mg/m<sup>3</sup>

# MATERIAL SAFETY DATA SHEET

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### EXPOSURE GUIDELINES & LIMITS:

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

TWA: 8-Hour Time-Weighted Average; STE: Short-Term Exposure; mg/m<sup>3</sup>: 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/m<sup>3</sup> as total dust or 5 mg/m<sup>3</sup> as respirable dust.
- May be required to meet Domestic Requirements for a Specific Destination(s).

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

<b>APPEARANCE:</b>	Industrial/commercial lead acid battery
<b>ODOUR:</b>	Odourless
<b>ODOUR THRESHOLD:</b>	NA
<b>PHYSICAL STATE:</b>	Sulfuric Acid: Liquid; Lead: solid
<b>pH:</b>	<1
<b>BOILING POINT:</b>	235-240° F (113-116° C) (as sulfuric acid)
<b>MELTING POINT:</b>	NA
<b>FREEZING POINT:</b>	NA
<b>VAPOUR PRESSURE:</b>	10 mmHg
<b>VAPOUR DENSITY (AIR = 1):</b>	> 1
<b>SPECIFIC GRAVITY (H<sub>2</sub>O = 1):</b>	1.27-1.33
<b>EVAPORATION RATE (n-BuAc=1):</b>	< 1
<b>SOLUBILITY IN WATER:</b>	100% (as sulfuric acid)
<b>FLASH POINT:</b>	Below room temperature (as hydrogen gas)
<b>AUTO-IGNITION TEMPERATURE:</b>	NA
<b>LOWER EXPLOSIVE LIMIT (LEL):</b>	4% (as hydrogen gas)
<b>UPPER EXPLOSIVE LIMIT (UEL):</b>	74% (as hydrogen gas)
<b>PARTITION COEFFICIENT:</b>	NA
<b>VISCOSITY (poise @ 25° C):</b>	Not Available

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**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**

<b>STABILITY:</b> <b>INCOMPATIBILITY (MATERIAL TO AVOID):</b>  <b>HAZARDOUS DECOMPOSITION BY-PRODUCTS:</b> <b>HAZARDOUS POLYMERIZATION:</b> <b>CONDITIONS TO AVOID:</b>	<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>
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**SECTION 11: TOXICOLOGICAL INFORMATION**

**ACUTE TOXICITY (Test Results Basis and Comments):**

Sulfuric acid:      LD50, Rat: 2140 mg/kg  
                            LC50, Guinea pig: 510 mg/m<sup>3</sup>  
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 19<sup>th</sup> 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.



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**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

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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

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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

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

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

**EXTINGUISHING MEDIA:**

CO<sub>2</sub>, dry chemical, water spray or fog.

**PRODUCTS OF COMBUSTION:**

These products are carbon oxides (CO, CO<sub>2</sub>).

**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 <sub>50</sub> (Species & Routes)	LC <sub>50</sub> (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

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

## 10. Stability and Reactivity

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

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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.

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### 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	

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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 (CO<sub>2</sub>)  
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<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), sulphur compounds (H<sub>2</sub>S), 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  
Internet: [www.petro-canada.ca/msds](http://www.petro-canada.ca/msds)  
Petro-Canada is a Suncor Energy business.

: Wear self-contained breathing apparatus for firefighting if

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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

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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



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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)

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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<sub>x</sub>, NO<sub>x</sub>, SO<sub>x</sub>, H<sub>2</sub>S, 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

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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

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### 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

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## 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

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## SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: [www.petro-canada.ca/msds](http://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

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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<sup>TM/MC</sup> TO-4<sup>+</sup> 10W

000003000493

Version 3.0

Revision Date 2015/02/17

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### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PRODURO<sup>TM/MC</sup> TO-4<sup>+</sup> 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

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## 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.

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## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

### Hazardous components

No hazardous ingredients

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## SECTION 4. FIRST AID MEASURES

- |   |   |
|---|---|
| If inhaled  | : Move to fresh air.<br>Artificial respiration and/or oxygen may be necessary.<br>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.<br>Wash skin thoroughly with soap and water or use recognized skin cleanser.<br>Wash clothing before reuse.<br>Seek medical advice. |
| In case of eye contact                                      | : Remove contact lenses.<br>Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.<br>Obtain medical attention.   |
| If swallowed  | : Rinse mouth with water.<br>DO NOT induce vomiting unless directed to do so by a physician or poison control center.<br>Never give anything by mouth to an unconscious person.<br>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.   |



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- |                                      |  |
|--------------------------------------|--|
| Specific hazards during firefighting | : Cool closed containers exposed to fire with water spray.   |
| Hazardous combustion products        | : Carbon oxides (CO, CO <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), sulphur oxides (SO <sub>x</sub> ), phosphorus oxides (PO <sub>x</sub> ), calcium oxides (CaO <sub>x</sub> ), zinc oxides (ZnO <sub>x</sub> ), 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.<br>Ensure adequate ventilation.<br>Evacuate personnel to safe areas.<br>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.<br>Remove all sources of ignition.<br>Soak up with inert absorbent material.<br>Non-sparking tools should be used.<br>Ensure adequate ventilation.<br>Contact the proper local authorities. |

---

### SECTION 7. HANDLING AND STORAGE

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

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### SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

# Material Safety Data Sheet

## PRODURO<sup>TM/MC</sup> TO-4<sup>+</sup> 10W

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### 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

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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 <sub>x</sub> , SO <sub>x</sub> , NO <sub>x</sub> , H <sub>2</sub> S, PO <sub>x</sub> , ZnO <sub>x</sub> , CaO <sub>x</sub> , 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
--	--

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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

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## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

#### Product:

Toxicity to fish : Remarks: No data available

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

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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

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## **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<sup>TM/MC</sup> TO-4<sup>+</sup> 10W**

**000003000493**



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Revision Date 2015/02/17

Print Date 2015/02/17

Not applicable

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## 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:**

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

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## 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

<b>Product name</b>	: SUPREME™ 15W-40 4-STROKE MOTORCYCLE OIL
<b>Code</b>	: SP4T15
<b>Material uses</b>	: 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.
<b>Manufacturer</b>	: Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga, Ontario Canada L5J 1K2
<b>In case of emergency</b>	: Suncor Energy: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

## 2. Hazards identification

<b>Physical state</b>	: Viscous liquid.
<b>Odour</b>	: Mild petroleum oil like.
<b>WHMIS (Canada)</b>	: Not controlled under WHMIS (Canada).
<b>OSHA/HCS status</b>	: 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.
<b>Emergency overview</b>	: No specific hazard.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation. Ingestion.
<b>Potential acute health effects</b>	
<b>Inhalation</b>	: No known significant effects or critical hazards.
<b>Ingestion</b>	: No known significant effects or critical hazards.
<b>Skin</b>	: Slightly irritating to the skin.
<b>Eyes</b>	: Slightly irritating to the eyes.
<b>Potential chronic health effects</b>	
<b>Chronic effects</b>	: No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: Not listed as carcinogenic by OSHA, NTP or IARC.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: No known significant effects or critical hazards.
<b>Medical conditions aggravated by over-exposure</b>	: 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, CO<sub>2</sub>), sulphur oxides (SO<sub>x</sub>), calcium oxides (CaO<sub>x</sub>), 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).	<b>ACGIH TLV (United States). Notes: (Mineral oil)</b> TWA: 5 mg/m <sup>3</sup> , (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<sub>x</sub>, H<sub>2</sub>S, 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
<b>TDG Classification</b>	Not regulated.	-	-	-		-
<b>DOT Classification</b>	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](http://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

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

## 2. Hazards identification

<b>Physical state</b>	: Viscous liquid.
<b>Odour</b>	: Mild petroleum oil like.
<b>WHMIS (Canada)</b>	: Not controlled under WHMIS (Canada).
<b>OSHA/HCS status</b>	: 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.
<b>Emergency overview</b>	: No specific hazard.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation. Ingestion.
<b><u>Potential acute health effects</u></b>	
<b>Inhalation</b>	: No known significant effects or critical hazards.
<b>Ingestion</b>	: No known significant effects or critical hazards.
<b>Skin</b>	: Slightly irritating to the skin.
<b>Eyes</b>	: Slightly irritating to the eyes.
<b><u>Potential chronic health effects</u></b>	
<b>Chronic effects</b>	: No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: Not listed as carcinogenic by OSHA, NTP or IARC.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: No known significant effects or critical hazards.
<b>Medical conditions aggravated by over-exposure</b>	: 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

<b><u>Name</u></b>	<b><u>CAS number</u></b>	<b><u>%</u></b>
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, CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), sulphur oxides (SO<sub>x</sub>), 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).	<b>ACGIH TLV (United States). Notes: (Mineral oil)</b> TWA: 5 mg/m <sup>3</sup> , (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<sub>x</sub>, NO<sub>x</sub>, SO<sub>x</sub>, 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**

Mixture of severely hydrotreated and hydrocracked and/or solvent-refined 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
<b>TDG Classification</b>	Not regulated.	-	-	-		-
<b>DOT Classification</b>	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.  
<sup>TM</sup> 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:

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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

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

## 2. Hazards identification

<b>Physical state</b>	: Clear viscous liquid.
<b>Odour</b>	: Odourless.
<b>WHMIS (Canada)</b>	:   Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic).
<b>OSHA/HCS status</b>	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
<b>Emergency overview</b>	: 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.
<b>Routes of entry</b>	: Dermal contact. Eye contact. Inhalation. Ingestion.
<b><u>Potential acute health effects</u></b>	
<b>Inhalation</b>	: Harmful by inhalation. Inhalation of dust may produce irritation of the respiratory tract.
<b>Ingestion</b>	: 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.
<b>Skin</b>	: Slightly irritating to the skin.
<b>Eyes</b>	: Slightly irritating to the eyes.
<b><u>Potential chronic health effects</u></b>	
<b>Chronic effects</b>	: Contains material that may cause target organ damage, based on animal data.

## 2 . Hazards identification

<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: Contains material which may cause birth defects, based on animal data.
<b>Developmental effects</b>	: Contains material which may cause developmental abnormalities, based on animal data.
<b>Fertility effects</b>	: No known significant effects or critical hazards.
<b>Target organs</b>	: 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.
<b>Medical conditions aggravated by over-exposure</b>	: 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

<b>Eye contact</b>	: 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.
<b>Skin contact</b>	: 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.
<b>Inhalation</b>	: 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.
<b>Ingestion</b>	: 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.
<b>Protection of first-aiders</b>	: 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.
<b>Notes to physician</b>	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

## 5 . Fire-fighting measures

<b>Flammability of the product</b>	: May be combustible at high temperature.
<b><u>Extinguishing media</u></b>	
<b>Suitable</b>	: Use an extinguishing agent suitable for the surrounding fire.
<b>Not suitable</b>	: None known.
<b>Special exposure hazards</b>	: 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, CO<sub>2</sub>), 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	<b>ACGIH TLV (United States).</b> CEIL: 100 mg/m <sup>3</sup> , (aerosol)

Consult local authorities for acceptable exposure limits.



## 8 . Exposure controls/personal protection

<b>Recommended monitoring procedures</b>	: 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.
<b>Engineering measures</b>	: 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.
<b>Hygiene measures</b>	: 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.
<b><u>Personal protection</u></b>	
<b>Respiratory</b>	: 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
<b>Hands</b>	: 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.
<b>Eyes</b>	: 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.
<b>Skin</b>	: 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.
<b>Environmental exposure controls</b>	: 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

<b>Physical state</b>	: Clear viscous liquid.
<b>Flash point</b>	: Closed cup: 116°C (240.8°F) [Tagliabue.] Open cup: 115.6°C (240.1°F) [Cleveland.]
<b>Auto-ignition temperature</b>	: Not available.
<b>Flammable limits</b>	: Lower: 3.2% Upper: 15.3%
<b>Colour</b>	: Green.
<b>Odour</b>	: Odourless.
<b>Odour threshold</b>	: Not available.
<b>pH</b>	: 7
<b>Boiling/condensation point</b>	: 197°C (386.6°F)
<b>Melting/freezing point</b>	: -13°C (8.6°F)
<b>Relative density</b>	: 1.12 to 1.15
<b>Vapour pressure</b>	: 0.008 kPa (0.06 mm Hg) [20°C]
<b>Vapour density</b>	: 2.1 [Air = 1]
<b>Volatility</b>	: 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 <sup>3</sup>	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
<b>TDG Classification</b>	Not regulated.	-	-	-		-
<b>DOT Classification</b>	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Ethylene glycol based coolant)	9	III		<b>Special provisions</b> 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.  
<sup>TM</sup> 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](http://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.

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### 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

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	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.	
<b>Carcinogenicity:</b>		
<b>IARC</b>	Group 1: Carcinogenic to humans	
	Benzene	71-43-2
<b>ACGIH</b>	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 (%)
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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 (CO<sub>2</sub>)  
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<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.

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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

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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.



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### 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

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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 <sub>x</sub> , NO <sub>x</sub> , 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

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### 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

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### STOT - repeated exposure

No data available

### Aspiration toxicity

No data available

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## 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

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## 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.

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### 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

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### SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: [www.petro-canada.ca/msds](http://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)**

	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.

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**Trade name: Helium (Compressed Gas)**

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**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:**  
CO<sub>2</sub>, 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.

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**Trade name: Helium (Compressed Gas)**

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**· 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**

<b>Form:</b>	Gaseous.
<b>Color:</b>	Colorless
<b>Odor:</b>	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.

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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

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CDN

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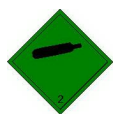
Reviewed on 07/10/2014

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 &amp; 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.

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**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>	: <b>Emergencies:</b> * 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	: <b>DANGER!</b> <b>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.</b> 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>	
<u>Inhalation</u>	: 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.
<u>Ingestion</u>	: 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).
<u>Skin</u>	: Liquid or vapour may irritate the skin. Harmful amounts may be absorbed through the skin
<u>Eyes</u>	: May cause eye irritation.
<u>Potential chronic health effects</u>	
<u>Chronic effects</u>	: Repeated or prolonged exposure of the skin may cause cracking and drying due to defatting of tissues. Chronic exposure may cause nervous system damage.
<u>Carcinogenicity</u>	: No known significant effects or critical hazards.
<u>Mutagenicity</u>	: No known significant effects or critical hazards.
<u>Teratogenicity</u>	: 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, CO<sub>2</sub>, 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 <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	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
<b>TDG Classification</b>	1208	Hexanes	3	-		<b>- PRODUCT REPORTABLE QUANTITY (PRQ):</b> 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](http://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<sup>TM/MC</sup> 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<sup>TM/MC</sup> 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

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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.

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- |                                      |   |
|--------------------------------------|---|
| 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 <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), sulphur oxides (SO <sub>x</sub> ), 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.<br>Ensure adequate ventilation.<br>Evacuate personnel to safe areas.<br>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.<br>Remove all sources of ignition.<br>Soak up with inert absorbent material.<br>Non-sparking tools should be used.<br>Ensure adequate ventilation.<br>Contact the proper local authorities. |

---

### SECTION 7. HANDLING AND STORAGE

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

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### 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)

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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 <sub>x</sub> , H <sub>2</sub> S, metal oxides, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

### SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of : Eye contact

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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

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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

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### Special precautions for user

Not applicable

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## 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:**

<b>DSL</b>	On the inventory, or in compliance with the inventory
<b>TSCA</b>	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
<b>EINECS</b>	On the inventory, or in compliance with the inventory
<b>IECSC</b>	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](http://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

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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.<br>Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.<br>Obtain medical attention.   |
| If swallowed  | : Rinse mouth with water.<br>DO NOT induce vomiting unless directed to do so by a physician or poison control center.<br>Never give anything by mouth to an unconscious person.<br>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<br>Carbon dioxide (CO <sub>2</sub> )<br>Water fog.<br>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 <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), sulphur oxides (SO <sub>x</sub> ), 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.<br>Ensure adequate ventilation.<br>Evacuate personnel to safe areas.<br>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.<br>Remove all sources of ignition.<br>Soak up with inert absorbent material.<br>Non-sparking tools should be used.<br>Ensure adequate ventilation.<br>Contact the proper local authorities. |



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**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.

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**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 <sup>3</sup> (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

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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)

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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.

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### 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 <sub>x</sub> , NO <sub>x</sub> , SO <sub>x</sub> , aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

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### SECTION 11. TOXICOLOGICAL INFORMATION

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

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### 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



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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

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## 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

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## SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: [www.petro-canada.ca/msds](http://www.petro-canada.ca/msds)

# Material Safety Data Sheet

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Version 1.0

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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

<b>Product name</b>	<b>MERCURY</b>	<b>CI#</b>	Not available.
<b>Chemical formula</b>	Hg	<b>CAS#</b>	7439-97-6
<b>Synonyms</b>	Quicksilver, AC-5666, AC-5666T, 55982, 56004	<b>Code</b>	AC-5666
<b>Supplier</b>	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	<b>Formula weight</b>	200.59
		<b>Supersedes</b>	
<b>Material uses</b>	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**

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<b>Physical state and appearance / Odor</b>	Silver metallic liquid. Odorless.
<b>pH (1% soln/water)</b>	Not available.
<b>Odor threshold</b>	Not applicable.
<b>Percent volatile</b>	Not available.
<b>Freezing point</b>	-38.89°C
<b>Boiling point</b>	356.9°C
<b>Specific gravity</b>	13.6 (Water = 1)
<b>Vapor density</b>	7 (Air = 1)
<b>Vapor pressure</b>	1 mm Hg @ 126°C
<b>Water/oil dist. coeff.</b>	Not applicable.
<b>Evaporation rate</b>	<<1
<b>Solubility</b>	Very slightly soluble in cold water.

**Section IV. Fire and Explosion Data**

<b>Flash point</b>	Not applicable.
<b>Flammable limits</b>	Not applicable.
<b>Auto-ignition temperature</b>	Not applicable.
<b>Fire degradation products</b>	Mercury. Oxides of mercury.
<b>Fire extinguishing procedures</b>	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.
<b>Fire and Explosion Hazards</b>	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**

<b>Routes of entry</b>	Inhalation and ingestion. Eye contact. Skin absorption.
<b>Effects of Acute Exposure</b>	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.
<b>Eye</b>	Causes irritation or burns.
<b>Skin</b>	Causes skin irritation. May cause dermatitis. May cause allergic skin reaction. Liquid can be absorbed in toxic amounts through intact skin. See inhalation.
<b>Inhalation</b>	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.
<b>Ingestion</b>	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

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### 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

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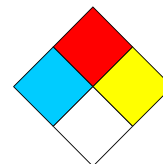
<b>Protective Clothing in case of spill and leak</b>	Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
<b>Spill and leak</b>	Evacuate the area. Absorb spilled mercury with specially designed mercury spill kits. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material.
<b>Waste disposal</b>	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.
<b>Storage and Handling</b>	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

<b>Protective clothing</b>	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.
<b>Engineering controls</b>	Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Do not use in unventilated spaces.

## Section X. Other Information

<b>Special Precautions or comments</b>	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).
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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:

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(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

<b>Product name</b>	<b>NITRIC ACID 5 - &lt;10%</b>	<b>CI#</b>	Not available.
<b>Chemical formula</b>	HNO <sub>3</sub> in H <sub>2</sub> O	<b>CAS#</b>	Not applicable.
<b>Synonyms</b>	Nitric acid 1N, R-3810A, M-5820, M-5828, M-10855, 62844	<b>Code</b>	R-3810A
<b>Supplier</b>	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	<b>Formula weight</b>	Not applicable.
		<b>Supersedes</b>	
<b>Material uses</b>	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 <sup>3</sup> ); STEL 4 ppm (10 mg/m <sup>3</sup> )
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/m<sup>3</sup> (Rat) (4 hour(s)).

### Section III. Physical Data

NITRIC ACID 5 - <10%

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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 <sub>2</sub> , N <sub>2</sub> O, N <sub>2</sub> O <sub>3</sub> ) 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%

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### 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, NO<sub>2</sub>, N<sub>2</sub>O<sub>3</sub>, N<sub>2</sub>O) 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%

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### 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:**

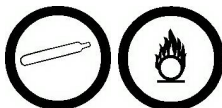


Oxidizing

- **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

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Trade name: Oxygen

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## · 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:**  
CO<sub>2</sub>, 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.

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Trade name: Oxygen

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## 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.

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Trade name: Oxygen

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· **Eye protection:** Safety glasses

## 9 Physical and chemical properties

### · General Information

<b>Form:</b>	Gaseous.
<b>Color:</b>	Colorless
<b>Odor:</b>	Odorless

### · Change in condition

<b>Melting point/Melting range:</b>	-219°C
<b>Boiling point/Boiling range:</b>	-182°C

<b>Flash point:</b>	Not applicable.
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<b>Flammability (solid, gaseous):</b>	Contact with combustible material may cause fire.
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<b>Danger of explosion:</b>	Explosive when mixed with combustible material.
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### · Solubility in / Miscibility with

<b>Water at 20°C:</b>	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.

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Trade name: Oxygen

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· 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.

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- **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

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**Trade name: Oxygen**

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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

<b>Product Identifier:</b> 50-010 BREEZE INTERIOR S/G LATEX-WHITE			
<b>Product Use:</b> Protective Coating			
<b>Manufacturer's Name:</b> General Paint Corp.		<b>Supplier's Name:</b> General Paint Corp.	
<b>Street Address:</b> 950 Raymur Ave		<b>Street Address:</b> 950 Raymur Ave	
<b>City:</b> Vancouver	<b>Province:</b> BC	<b>City:</b> Vancouver	<b>Province:</b> BC
<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (604) 253-4022	<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (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

<b>Physical State:</b> Liquid	<b>Odour and Appearance:</b> liquid with a slight ammonia smell	<b>Coating VOC(gm/l):</b> 130	<b>Odour Threshold(ppm):</b> Not Available
<b>Specific Gravity:</b> 1.22	<b>Vapor Density(air=1):</b> Not Available	<b>Vapor Pressure(mmHg):</b> Not Available	<b>Evaporation Rate:</b> Not Available
<b>Boiling Point(° C):</b> Greater than 100°C	<b>Freezing Point(° C):</b> Less than 0°C	<b>pH:</b> 8.5-9.5	<b>Coefficient of Water/Oil Distribution:</b> Not Available

## SECTION 4 - FIRE AND EXPLOSION DATA

<b>Flammability:</b> No	<b>If yes, Under which Conditions?</b> Not Applicable	
<b>Means of Extinction:</b> Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
<b>Flashpoint and Method:</b> "Not Applicable	<b>Upper Flammable Lt (% by Volume):</b> Not Applicable	<b>Lower Flammable Lt (% by Volume):</b> Not Applicable
<b>Autoignition Temperature:</b> Not Applicable	<b>Explosion Data - Sensitivity to Impact:</b> No	<b>Explosion Data - Sensitivity to Static discharges:</b> No
<b>Hazardous Combustion Pdts:</b> carbon monoxide, carbon dioxide, acrid, irritant fumes (components not specified), nitrogen oxides, sulfur oxides, ammonium nitrate, nitrogen, nitrogen dioxide		

## SECTION 5 - REACTIVITY DATA

<b>Chemical Stability:</b> Stable	<b>If Yes, Under which Conditions?</b> Not Applicable
<b>Incompatibility with other substances:</b> Yes	<b>If yes, which ones?</b> Strong Acids Strong Oxidizing agents
<b>Reactivity, and under what conditions?</b> heat, generation of dust, temperatures above 320°C	
<b>Hazardous Decomposition Products:</b> oxides of nitrogen, acetaldehyde, acetic acid, ammonia, aldehydes, hydrogen	

## SECTION 6 - TOXICOLOGICAL PROPERTIES

<b>Route of Entry</b>	<b>Skin Contact:</b> Yes	<b>Absorption:</b> Yes	<b>Eye Contact:</b> Yes	<b>Inhalation:</b> Yes	<b>Ingestion:</b> Yes
<b>Effects to Acute exposure to Product:</b> Insufficient Data					
<b>Effects to Chronic exposure to Product:</b> PROPYLENE GLYCOL has been known to cause LACTIC ACIDOSIS.					
<b>Exposure Limits (Value,Units,By)</b> TITANIUM DIOXIDE: 10 mg/m3 ACGIH PROPYLENE GLYCOL: 10 mg/m3 AIHA					
<b>Irritancy (if yes, explain)</b>					
<b>Sensitization (if yes, explain)</b>			<b>Carcinogenicity (if yes, explain)</b> TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
<b>Reproductive Toxicity (if yes, explain)</b>			<b>Teratogenicity (if yes, explain)</b>		
<b>Mutagenicity (if yes, explain)</b>			<b>Synergistic Products (if yes, explain)</b>		

## SECTION 7 - PREVENTIVE MEASURES

<b>Personal Protective Equipment</b>	<b>Gloves:</b> No	<b>Respirator:</b> Yes	<b>Eye:</b> No	<b>Footwear:</b> No	<b>Clothing:</b> No	<b>Other:</b> No
<b>If checked, specify type:</b> Respirator: NIOSH APPROVED						
<b>Engineering controls (specify such as ventilation, enclosed process):</b> Use mechanical ventilation to reduce exposure, ground all equipment and avoid exposure to open flames or sparks.						
<b>Leak and Spill Procedure:</b> 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.						
<b>Waste Disposal:</b> Check with Federal, Provincial and local government regulations and requirements for disposal.						
<b>Handling Procedures and Equipment:</b> 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.						
<b>Storage Requirements:</b> 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.						
<b>Special Shipping Information:</b> 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

<b>Product Identifier:</b> 12-060 FRESHTEX FLAT CEILING ALKYD			
<b>Product Use:</b> Protective Coating			
<b>Manufacturer's Name:</b> General Paint Corp.		<b>Supplier's Name:</b> General Paint Corp.	
<b>Street Address:</b> 950 Raymur Ave		<b>Street Address:</b> 950 Raymur Ave	
<b>City:</b> Vancouver	<b>Province:</b> BC	<b>City:</b> Vancouver	<b>Province:</b> BC
<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (604) 253-4022	<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (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

<b>Physical State:</b> Liquid	<b>Odour and Appearance:</b> liquid with a solvent smell	<b>Coating VOC(gm/l):</b> 392	<b>Odour Threshold(ppm):</b> Not Available
<b>Specific Gravity:</b> 1.61	<b>Vapor Density(air=1):</b> Not Available	<b>Vapor Pressure(mmHg):</b> Not Available	<b>Evaporation Rate:</b> Not Available
<b>Boiling Point(° C):</b> Not Available	<b>Freezing Point(° C):</b> Not Available	<b>pH:</b> Not Applicable	<b>Coefficient of Water/Oil Distribution:</b> Not Available

## SECTION 4 - FIRE AND EXPLOSION DATA

<b>Flammability:</b> Yes	<b>If yes, Under which Conditions?</b> Flammable Liquid	
<b>Means of Extinction:</b> Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
<b>Flashpoint and Method:</b> 60 °C Closed Cup	<b>Upper Flammable Lt (% by Volume):</b> Not Available	<b>Lower Flammable Lt (% by Volume):</b> Not Available
<b>Autoignition Temperature:</b> Not Available	<b>Explosion Data - Sensitivity to Impact:</b> No	<b>Explosion Data - Sensitivity to Static discharges:</b> No
<b>Hazardous Combustion Pdts:</b> carbon monoxide, carbon dioxide, calcium oxide, aldehydes, nitrogen		

oxides, sulfur oxides, magnesium oxide
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## SECTION 5 - REACTIVITY DATA

<b>Chemical Stability:</b> Stable	<b>If Yes, Under which Conditions?</b> Not Applicable
<b>Incompatibility with other substances:</b> Yes	<b>If yes, which ones?</b> Strong Acids Strong Oxidizing agents Strong Bases
<b>Reactivity, and under what conditions?</b> heat, ignition sources, potassium t-butoxide, generation of dust, nitric acid, dichlorohydrantion, heat, sparks, or other ignition sources	
<b>Hazardous Decomposition Products:</b> propylene oxide, carbon dioxide	

## SECTION 6 - TOXICOLOGICAL PROPERTIES

<b>Route of Entry</b>	<b>Skin Contact:</b> Yes	<b>Absorption:</b> Yes	<b>Eye Contact:</b> Yes	<b>Inhalation:</b> Yes	<b>Ingestion:</b> Yes
<b>Effects to Acute exposure to Product:</b> 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.					
<b>Effects to Chronic exposure to Product:</b> ALIPHATIC SOLVENT has been known to cause DERMATITIS, KIDNEY DAMMAGE.					
<b>Exposure Limits (Value,Units,By)</b> TITANIUM DIOXIDE: 10 mg/m3 ACGIH ALIPHATIC SOLVENT: N/A HEAVY NAPHTHA (HYDROTREATED): 1200 mg/m3 Manufacturer (ESSO)					
<b>Irritancy (if yes, explain)</b>					
<b>Sensitization (if yes, explain)</b>			<b>Carcinogenicity (if yes, explain)</b> TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
<b>Reproductive Toxicity (if yes, explain)</b>			<b>Teratogenicity (if yes, explain)</b>		
<b>Mutagenicity (if yes, explain)</b>			<b>Synergistic Products (if yes, explain)</b>		

## SECTION 7 - PREVENTIVE MEASURES

<b>Personal Protective Equipment</b>	<b>Gloves:</b> Yes	<b>Respirator:</b> Yes	<b>Eye:</b> Yes	<b>Footwear:</b> No	<b>Clothing:</b> No	<b>Other:</b> No
<b>If checked, specify type:</b> Gloves: BUTYL RUBBER Respirator: NIOSH APPROVED Eye: SPLASH RESISTANT						
<b>Engineering controls (specify such as ventilation, enclosed process):</b> Use mechanical ventilation to reduce exposure.						
<b>Leak and Spill Procedure:</b> 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.						
<b>Waste Disposal:</b> Check with Federal, Provincial and local government regulations and requirements for disposal.						
<b>Handling Procedures and Equipment:</b> 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

<b>Product Identifier:</b> 57-010 KITCHEN & BATH, GLOSS - WHITE			
<b>Product Use:</b> Protective Coating			
<b>Manufacturer's Name:</b> General Paint Corp.		<b>Supplier's Name:</b> General Paint Corp.	
<b>Street Address:</b> 950 Raymur Ave		<b>Street Address:</b> 950 Raymur Ave	
<b>City:</b> Vancouver	<b>Province:</b> BC	<b>City:</b> Vancouver	<b>Province:</b> BC
<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (604) 253-4022	<b>Postal Code:</b> V6A 3L5	<b>Emergency Phone:</b> (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

<b>Physical State:</b> Liquid	<b>Odour and Appearance:</b> liquid with a slight ammonia smell	<b>Coating VOC(gm/l):</b> 218	<b>Odour Threshold(ppm):</b> Not Available
<b>Specific Gravity:</b> 1.22	<b>Vapor Density(air=1):</b> Not Available	<b>Vapor Pressure(mmHg):</b> Not Available	<b>Evaporation Rate:</b> Not Available
<b>Boiling Point(° C):</b> Greater than 100°C	<b>Freezing Point(° C):</b> Less than 0°C	<b>pH:</b> 8.5-9.5	<b>Coefficient of Water/Oil Distribution:</b> Not Available

## SECTION 4 - FIRE AND EXPLOSION DATA

<b>Flammability:</b> No	<b>If yes, Under which Conditions?</b> Not Applicable	
<b>Means of Extinction:</b> Alcohol foam, Carbon dioxide, Dry chemical powder, Polymer foam		
<b>Flashpoint and Method:</b> "Not Applicable	<b>Upper Flammable Lt (% by Volume):</b> Not Applicable	<b>Lower Flammable Lt (% by Volume):</b> Not Applicable
<b>Autoignition Temperature:</b> Not Applicable	<b>Explosion Data - Sensitivity to Impact:</b> No	<b>Explosion Data - Sensitivity to Static discharges:</b> No
<b>Hazardous Combustion Pdts:</b> carbon monoxide, carbon dioxide, aldehydes, nitrogen oxides, sulfur oxides, methyl methacrylate, butyl acrylate, carbone dioxide, methane		



## SECTION 5 - REACTIVITY DATA

<b>Chemical Stability:</b> Stable	<b>If Yes, Under which Conditions?</b> Not Applicable
<b>Incompatibility with other substances:</b> Yes	<b>If yes, which ones?</b> Strong Acids Strong Oxidizing agents Strong Bases
<b>Reactivity, and under what conditions?</b> heat, static discharge, ignition sources, generation of dust, nitric acid, dichlorohydrantion, heat, sparks, or other ignition sources	
<b>Hazardous Decomposition Products:</b> oxides of nitrogen, ammonia, aldehydes	

## SECTION 6 - TOXICOLOGICAL PROPERTIES

<b>Route of Entry</b>	<b>Skin Contact:</b> Yes	<b>Absorption:</b> Yes	<b>Eye Contact:</b> Yes	<b>Inhalation:</b> Yes	<b>Ingestion:</b> Yes
<b>Effects to Acute exposure to Product:</b> Insufficient Data					
<b>Effects to Chronic exposure to Product:</b> PROPYLENE GLYCOL has been known to cause LACTIC ACIDOSIS.					
<b>Exposure Limits (Value,Units,By)</b> TITANIUM DIOXIDE: 10 mg/m3 ACGIH PROPYLENE GLYCOL: 10 mg/m3 AIHA					
<b>Irritancy (if yes, explain)</b>					
<b>Sensitization (if yes, explain)</b>			<b>Carcinogenicity (if yes, explain)</b> TITANIUM DIOXIDE is possibly carcinogenic to humans(2B) by IARC.		
<b>Reproductive Toxicity (if yes, explain)</b>			<b>Teratogenicity (if yes, explain)</b>		
<b>Mutagenicity (if yes, explain)</b> (DNA INHIBITION: SUBCUTANEOUS, MOUSE = 8000 MG/KG.; CYTOGENETIC ANALYSIS: SUBCUTANEOUS, MOUSE = 8000 MG/KG)			<b>Synergistic Products (if yes, explain)</b>		

## SECTION 7 - PREVENTIVE MEASURES

<b>Personal Protective Equipment</b>	<b>Gloves:</b> No	<b>Respirator:</b> Yes	<b>Eye:</b> No	<b>Footwear:</b> No	<b>Clothing:</b> No	<b>Other:</b> No
<b>If checked, specify type:</b> Respirator: NIOSH APPROVED						
<b>Engineering controls (specify such as ventilation, enclosed process):</b> Use mechanical ventilation to reduce exposure, ground all equipment and avoid exposure to open flames or sparks.						
<b>Leak and Spill Procedure:</b> 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.						
<b>Waste Disposal:</b> Check with Federal, Provincial and local government regulations and requirements for disposal.						
<b>Handling Procedures and Equipment:</b> 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

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Version 1.0

Revision Date 2015/03/30

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### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PROPANE

Synonyms : Propane HD-5, Propane commercial, Liquefied Petroleum Gas (LPG), C<sub>3</sub>H<sub>8</sub>, 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,

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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.

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- |   |   |
|---|---|
| In case of eye contact                                      | : Remove contact lenses.<br>Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.<br>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.<br>Cool closed containers exposed to fire with water spray. |
| Hazardous combustion products                 | : Carbon oxides (CO, CO <sub>2</sub> ), 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.<br>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.<br>Ensure adequate ventilation.<br>Evacuate personnel to safe areas.<br>In case of inadequate ventilation wear respiratory protection.<br>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.<br>Ensure adequate ventilation.<br>Use explosion-proof ventilation equipment.<br>Non-sparking tools should be used.<br>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 <sup>3</sup>	CA QC OEL
propylene	115-07-1	TWA	500 ppm 860 mg/m <sup>3</sup>	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 <sup>3</sup>	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.

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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<br>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.<br>Wear suitable protective equipment.  |
| Hygiene measures            | : Remove and wash contaminated clothing and gloves, including the inside, before re-use.<br>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)<br>Method: closed cup   |
| Fire Point                  | : No data available   |

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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 CO <sub>x</sub> , smoke and irritating vapours when heated to decomposition.

### SECTION 11. TOXICOLOGICAL INFORMATION

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



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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

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## SECTION 12. ECOLOGICAL INFORMATION

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### 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.

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## SECTION 14. TRANSPORT INFORMATION

### International Regulation

#### IATA-DGR

UN/ID No. : 1978

Proper shipping name : Propane

Class : 2.1

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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

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## SECTION 16. OTHER INFORMATION

For Copy of (M)SDS : Internet: [www.petro-canada.ca/msds](http://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

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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

<b>Product Name:</b> Propylene	<b>Trade Name:</b> FG2; Liquified petroleum gas
<b>Product Use:</b> Many.	
<b>Chemical Name:</b> Propylene	<b>Synonym:</b> Propene, methylethene, methylethylene, 1-Propene, 1-Propylene
<b>Chemical Formula:</b> C <sub>3</sub> H <sub>6</sub>	<b>Chemical Family:</b> Alkenes
<b>Telephone:</b>	<b>Supplier /Manufacture:</b> Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2  <b>Phone:</b> 905-803-1600 <b>Fax:</b> 905-803-1682
<b>Emergencies:</b> * 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.*

## 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:**

CO<sub>2</sub>, dry chemical, water spray or fog.

**PRODUCTS OF COMBUSTION:**

These products are carbon oxides (CO, CO<sub>2</sub>).

**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 <sub>50</sub> (Species & Routes)	LC <sub>50</sub> (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

<b>PHYSICAL STATE:</b> Gas. (Compressed Gas.)	<b>FREEZING POINT:</b> -185.25°C (-301.4°F)	<b>pH:</b> Not applicable.
<b>BOILING POINT</b> -47.72°C (-53.9°F)	<b>VAPOUR PRESSURE</b> 915.69 kPa (@ 20°C)	<b>MOLECULAR WEIGHT:</b> 42.081 g/mole
<b>SPECIFIC GRAVITY: LIQUID ( Water = 1)</b> 0.52 @ 20 C	<b>SOLUBILITY IN WATER,</b> Negligible.	
<b>SPECIFIC GRAVITY: VAPOUR (air = 1)</b> 1.45 g/ml @ 21.1 C	<b>EVAPORATION RATE (Butyl Acetate=1):</b> > 1 compared to (Butyl Acetate = 1)	<b>COEFFICIENT OF WATER/OIL DISTRIBUTION:</b> Not applicable.
<b>VAPOUR DENSITY:</b> 0.00177 g/ml @ 21.1 C	<b>% VOLATILES BY VOLUME:</b> 100% (v/v).	<b>ODOUR THRESHOLD:</b> Not available.

**APPEARANCE & ODOUR:** Colourless. Odour: Faintly sweet.

## 10. Stability and Reactivity

<b>STABILITY:</b>	The product is stable.
<b>CONDITIONS OF CHEMICAL INSTABILITY:</b>	None known.
<b>INCOMPATIBILITY (materials to avoid):</b>	Oxidizing agents, halogens and acids.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Thermal decomposition or burning may produce carbon monoxide/carbon dioxide.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur.
<b>CONDITIONS TO AVOID:</b>	Thermal decomposition or burning may produce CO/CO <sub>2</sub> . The welding & cutting process may form reaction products such as CO/CO <sub>2</sub> .
<b>CONDITIONS OF REACTIVITY:</b>	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 Liquefied Petroleum Gases)

<b>HAZARD CLASS:</b>	CLASS 2.1: Flammable gas.	<b>IDENTIFICATION #:</b> UN1077 (or 1075 if using the shipping name Liquefied Petroleum Gas)	<b>PRODUCT REPORTABLE QUANTITY (PRQ):</b> Any accidental release in any quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.
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**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](http://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

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# 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 CO<sub>2</sub>, 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.

<b>Most important symptoms/effects</b>	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
<b>Notes to Physician</b>	Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Flooding quantities of water.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	No information available
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	Not applicable
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Oxidizing Properties</b>	Oxidizer
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	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

<b>Personal Precautions</b>	Use personal protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes and clothing.
<b>Environmental Precautions</b>	See Section 12 for additional ecological information.
<b>Methods for Containment and Clean Up</b>	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

<b>Handling</b>	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.
<b>Storage</b>	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 <sup>3</sup>		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Sodium persulfate			TWA: 0.1 mg/m <sup>3</sup>

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

<b>Physical State</b>	Powder Solid
<b>Appearance</b>	White
<b>Odor</b>	Odorless
<b>Odor Threshold</b>	No information available
<b>pH</b>	5 - 7 550 g/l H <sub>2</sub> O
<b>Melting Point/Range</b>	100 °C / 212 °F
<b>Boiling Point/Range</b>	No information available
<b>Flash Point</b>	No information available
<b>Evaporation Rate</b>	Not applicable
<b>Flammability (solid,gas)</b>	No information available
<b>Flammability or explosive limits</b>	
Upper	No data available
Lower	No data available
<b>Vapor Pressure</b>	No information available
<b>Vapor Density</b>	Not applicable
<b>Relative Density</b>	2.6
<b>Solubility</b>	No information available
<b>Partition coefficient; n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	Not applicable
<b>Decomposition Temperature</b>	180 °C
<b>Viscosity</b>	Not applicable
<b>Molecular Formula</b>	Na <sub>2</sub> O <sub>8</sub> S <sub>2</sub>
<b>Molecular Weight</b>	238.09

## 10. Stability and reactivity

**Reactive Hazard** Yes

**Stability** Oxidizer: Contact with combustible/organic material may cause fire. Hygroscopic.



<b>Conditions to Avoid</b>	Incompatible products. Excess heat. Avoid dust formation. Exposure to moisture. Combustible material.
<b>Incompatible Materials</b>	Strong oxidizing agents, Acids, Strong reducing agents, Combustible material
<b>Hazardous Decomposition Products</b>	Sulfur oxides, oxygen
<b>Hazardous Polymerization</b>	Hazardous polymerization does not occur.
<b>Hazardous Reactions</b>	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

<b>Irritation</b>	Irritating to eyes, respiratory system and skin
<b>Sensitization</b>	No information available May cause sensitization by inhalation and skin contact
<b>Carcinogenicity</b>	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 Transportation**Reportable 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, <a href="http://www.recochem.com">www.recochem.com</a>
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

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#### 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

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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

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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 <sup>3</sup> (rat) (4-hour exposure)	5000 mg/kg (rat)	> 3000 mg/kg (rabbit)
Naphthalene	739.2 mg/m <sup>3</sup> (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 <sup>3</sup> (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		

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	minnow); 96-hour)			
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#### 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

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## 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](http://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.

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# 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.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	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 (CO<sub>2</sub>) 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

<b>SECTION 6</b>	<b>ACCIDENTAL RELEASE MEASURES</b>
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### **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.

<b>SECTION 7</b>	<b>HANDLING AND STORAGE</b>
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### **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/m<sup>3</sup> - ACGIH TLV, 10 mg/m<sup>3</sup> - 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.

<b>SECTION 9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
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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 mm<sup>2</sup>/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

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
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**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**

<b>Route of Exposure</b>	<b>Conclusion / Remarks</b>
<b>INHALATION</b>	
Toxicity (Rat): LC50 > 5000 mg/m <sup>3</sup>	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.
<b>INGESTION</b>	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
<b>Skin</b>	
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.
<b>Eye</b>	
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

<b>SECTION 12</b>	<b>ECOLOGICAL INFORMATION</b>
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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.

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
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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.

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
-------------------	------------------------------

**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

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**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

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
-------------------	--------------------------

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

-----  
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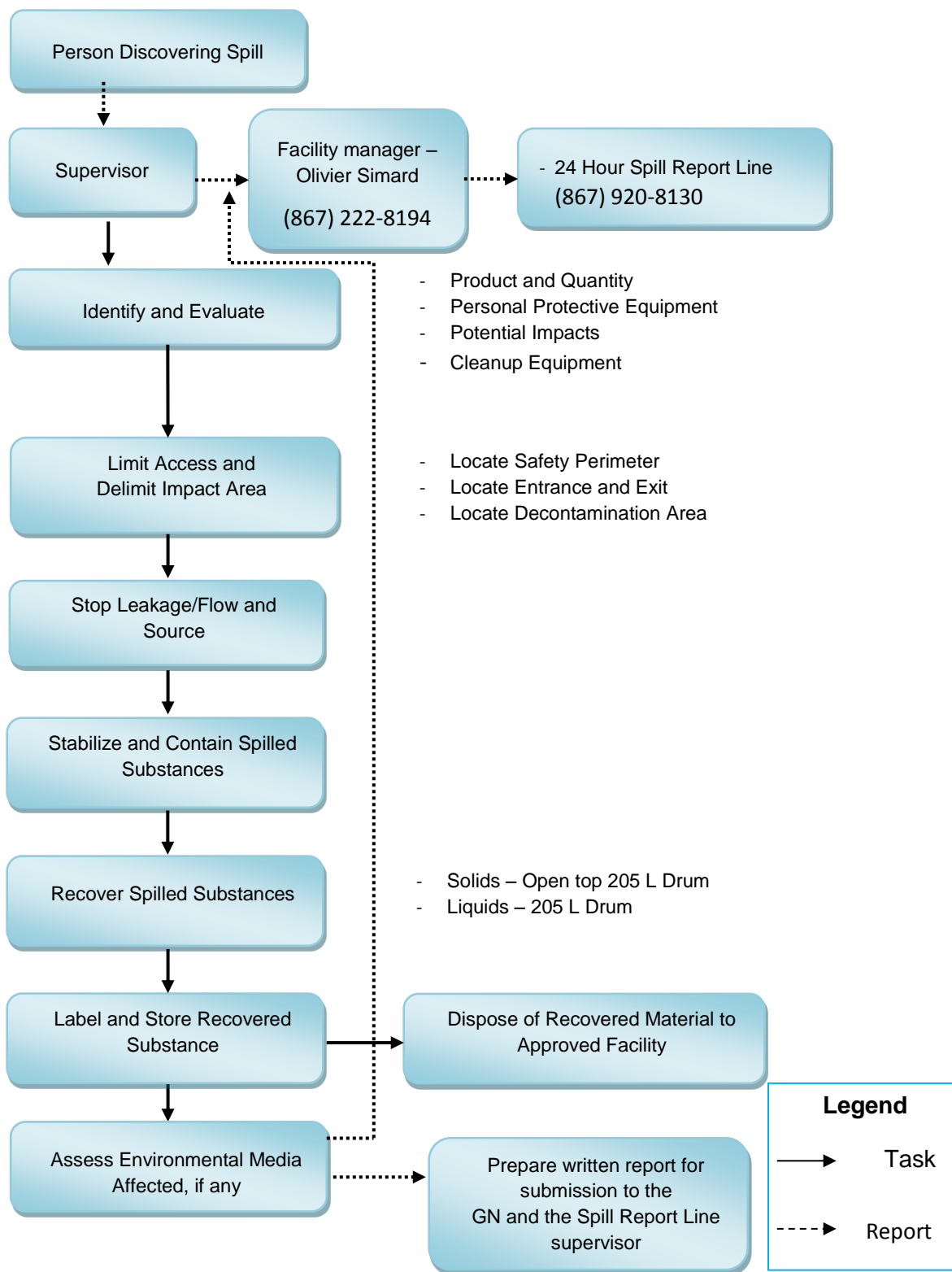
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DGN: 5007051 (1013422)

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Prepared By: Imperial Oil Limited, IH and Product Safety

## **APPENDIX B**

### **SPILL RESPONSE FLOWCHART**

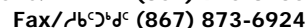
# Spill Response



## **APPENDIX C**

### **STANDARD NUNAVUT SPILL REPORT FORM**





## **APPENDIX O**

### **OPERATION MANUALS**

# **OPERATION AND MANAGEMENT PLAN**

## **CONTAMINATED WATER TREATMENT UNIT**

*Privileged and confidential document presented to*



**Manager of Licensing**  
Nunavut Water Board  
P.O. Box 119  
Gjoa Haven (Nunavut) X0B 1J0  
Telephone: 867 360-6338  
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**FINAL**

February 2016

O/Ref.: QE15-102-2

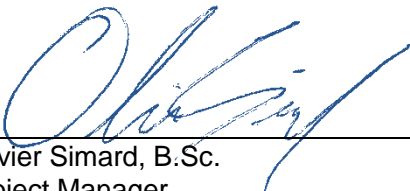


# **OPERATION AND MANAGEMENT PLAN CONTAMINATED WATER TREATMENT UNIT**

*Privileged and confidential document presented to*

## ***NUNAVUT WATER BOARD AND NUNAVUT IMPACT REVIEW BOARD***

Prepared and verified by:



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Olivier Simard, B.Sc.  
Project Manager

Approved by:



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

**FINAL**

February 2016

O/Ref.: QE15-102-2

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## LIST OF ABBREVIATIONS

AST:	Aboveground storage tank
CALA:	Canadian Association for Laboratory Accreditation Inc.
INAC:	Indigenous and Northern Affairs Canada
NWB:	Nunavut Water Board
PHC:	Petroleum hydrocarbons
WTU:	Water treatment unit

## **1. OPERATION AND MANAGEMENT PLAN**

### **1.1 General**

The facility was developed based on a need arising from clients with impacted water and/or snow and ice resulting from spills from storage tanks or water from tank washing. The impacted water is transported to the facility for treatment.

The facility contains a multi-step filtration system to treat the impacted water. Water is initially passed through an oil/water separator and particulate filter to remove free product and suspended solids. Following the initial filtration, water is then circulated through Sanexen's patented ULTRASORPTION™ filters and activated carbon filters to remove organic chemicals. Inorganic contamination may be removed through precipitation or filtration through various media (e.g., ion-exchange resin). The treated water is then stored in clean tanks for sampling and analysis in a CALA certified laboratory to ensure it respects the NWB criteria prior to discharge.

The system will treat hydrocarbon impacted water (including water originating from impacted snow and ice) as well as water impacted by various inorganic (i.e., metals, pH, etc.) and organic (i.e., solvents, glycol, etc.) contaminants. The facility can treat up to a maximum of 15 m<sup>3</sup> of water per day. The total storage capacity of impacted water before treatment, as well as for treated water awaiting analysis and discharge, is 30 m<sup>3</sup>. Berms will be constructed around the tanks storing the contaminated and treated water.

#### **1.1.1 Location**

The facility is located on a property in the western part of Iqaluit, in an area referred to as the West 40. The approximate coordinates of the centre of the property are:

**Latitude:** 63°44'38.22" N

**Longitude:** 68°32'58.59" W

### **1.2 Hazardous Liquids Found On-Site and Storage Capacity**

No fuel or other hazardous liquids are used during the operation of the water treatment system. Hydrocarbons may be recovered from the oil/water separator, and such waste oil will either be used in a waste oil furnace, or containerized for off-site disposal. The volume of waste oil to be managed from the treatment system varies and is difficult to predict, as it is dependent on the degree of impacted snow/water.

The facility is located in an industrial area of Iqaluit and has a permit from the Government of Nunavut to operate as an authorized hazardous waste transfer station. As such,

Qikiqtaaluk Environmental Inc. (QE) already has spill response materials, additional containers, including tote tanks and overpack drums, in stock and can therefore easily manage any waste oil generated by the treatment system.

All fuel storage containers will be situated in a manner that allows easy access and removal of containers in the event of leaks or spills. Fuel caches in excess of 20 drums will be inspected daily.

For fuel transfer operations with drums of waste oil, 12-volt fuel pumps, gear pumps, diaphragm pumps and hand pumps shall be used.

### **1.3 Secondary Containment Systems**

#### **1.3.1 Water Storage Tanks (Impacted and Treated Water)**

A secondary containment system will be constructed around both the treated and impacted water storage tanks to prevent any potential spills of contaminated water. A containment berm will be constructed around the ASTs to serve as a secondary means of containment in the event of a spill.

#### **1.3.2 Recovered Petroleum Hydrocarbons, Liquid Sludge and Waste Filter Media**

Petroleum hydrocarbons and free product recovered during water treatment operations will be containerized in closed top 205 L drums for off-site shipment and disposal. Waste filter media is packaged in Quatrex-type containers for off-site shipment and disposal.

Prior to loading on the sealift, waste liquids and filter media will be stored on-site.

### **1.4 PHC Impacted Soils**

During remediation work following a spill, impacted soils are often excavated from affected snow/ice/water source areas. Impacted soils will either be containerized and shipped for off-site disposal at authorized facilities, or treated in the newly-constructed QE soil treatment facility.

### **1.5 Transport and Disposal of Contaminated Materials**

Contaminated materials from treatment operations (filter media, sludge, petroleum hydrocarbons, etc.) are packaged in accordance with applicable regulations and transported by truck to the barging area for shipment and off-site disposal. The truck will be equipped with a spill kit and fire extinguisher and the operator trained in spill response.

To minimize storage time at the beach, materials will be transported to the beach barging area a maximum of one week prior to the arrival of the sealift. Whenever possible, the



fenced Coast Guard Compound will be used to temporarily store the waste prior to loading the ship.

## 1.6 Transport of Treated Water to Discharge Location

It is not necessary to transport treated water, as water will be discharged at an approved location on the facility property. Should transport eventually be required, based on a change in discharge location, the water will be pumped into a tank located on a roll-off platform. The water will then be transported using a roll-off truck to the discharge location. The truck will be equipped with a spill kit and the operator trained in spill response.

## 1.7 Treated Effluent Quality Monitoring

Based on the conditions of the water licence (No. 1BR-THI1419), a monitoring station with ID THI-1 (Water) was established to monitor the effluent from the WTU to be discharged at the Final Discharge Point.

One sample is collected at Monitoring Station THI-1 prior to each batch discharge event and prior to completion of discharge. The sample shall be analyzed for the parameters included in Table 1, below.

**TABLE 1: Discharge Water Analysis Parameters**

Ammonia Nitrogen	Sodium	Total Lead
BTEX <sup>1</sup>	Sulphate	Total Manganese
Calcium	Total Alkalinity	Total Mercury
Chloride	Total Aluminum	Total Nickel
Conductivity	Total Arsenic	Total Phenols
Magnesium	Total Cadmium	Total Phosphorous
Nitrate – Nitrite	Total Chromium	Total Suspended Solids
Oil and Grease (visual)	Total Cobalt	Total Zinc
PAH <sup>2</sup>	Total Copper	TPH <sup>4</sup>
pH <sup>3</sup>	Total Hardness	
Potassium	Total Iron	

1. Benzene, toluene, ethylbenzene, xylene

2. Polycyclic aromatic hydrocarbons

3. Measure of acidity or alkalinity

4. Total petroleum hydrocarbons

The monitoring of the water quality in the drainage ditch located at the perimeter of the property will be carried out in accordance with the water quality monitoring program presented in the Environmental Protection Plan.

Among the parameters to be monitored, Table 2 presents the maximum allowable concentrations of any grab sample to be met before discharge.

**TABLE 2: Maximum Allowable Concentrations**

Parameter	Maximum Allowable Concentration of any Grab Sample (mg/L)
pH <sup>1</sup>	6.5 to 9 (pH units)
TSS <sup>2</sup>	50
Oil and Grease	15 and no visible sheen
Total Lead	0.001
Benzene	0.370
Toluene	0.002
Ethyl benzene	0.090

1. Measure of acidity or basicity

2. Total suspended solids

## 1.8 Soil Quality Monitoring

In addition to effluent quality monitoring, yearly soil sampling will be carried out at the Final Point of Discharge to ensure that the water treatment activities are not causing a negative impact on the surrounding environment.

## 1.9 Operation of the Water Treatment Unit

The water treatment unit is operated as follows:

1. Water is collected in the holding tank and allowed to settle for a minimum of 24 hours;
2. Any free product floating on the surface of the tank will be pumped off into sound drums for disposal;
3. If the water has known metal contamination, then the appropriate treatment for the metal contamination is done in the holding tank, either by precipitation through pH adjustment or using an ion resin;
4. A flocculant is added to the water to remove any suspended particles;
5. An air compressor is started and the water is pumped into the oil/water separator;
6. Once the oil/water separator is filled, water is pumped into the intermediate holding tank;
7. Should the water not show any signs of free product, it is then pumped through the filters to remove the contamination, and into the treated water holding tank;
8. The water is checked for clarity and if it appears to have been properly treated, it is pumped into a clean holding tank to be tested prior to discharge;

9. At no time should the pressure in the system rise above 10 psi;
10. The system must be monitored at all times during operation until the automated shut-off system is connected and fully tested to ensure that it is operating properly;
11. Treated water is then sampled and sent to a CALA accredited laboratory for analysis. If results meet discharge criteria, then they are submitted to an INAC Water Resource Officer and permission is requested for discharge. Once permission is obtained, the water is discharged at the authorized discharge location;
12. Should water not meet the discharge criteria, it is treated until the discharge criteria are met.

## OPERATION AND MANAGEMENT PLAN SOIL TREATMENT FACILITY

*Document presented to:*



and



**FINAL**

February 2016

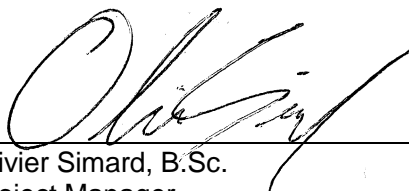
O/Ref.: QE15-102-2

# OPERATION AND MANAGEMENT PLAN SOIL TREATMENT FACILITY


*Document presented to:*

***NUNAVUT WATER BOARD  
AND  
NUNAVUT IMPACT REVIEW BOARD***

Prepared by:

  
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Project Manager

Verified by:

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



February 2016

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## LIST OF ABBREVIATIONS

BTEX:	Benzene, toluene, ethylbenzene and xylenes
CO <sub>2</sub> :	Carbon dioxide
HDPE:	High-density polyethylene
m.t.:	Metric tonne
MAH:	Monocyclic aromatic hydrocarbons
O <sub>2</sub> :	Oxygen
PAH:	Polycyclic aromatic hydrocarbons
pH:	Measure of acidity or alkalinity
PHC:	Petroleum hydrocarbons
psi:	Pounds per square inch
psig:	Pounds per square inch gage
PVC:	Polyvinyl chloride
T:	Temperature



## **1. INTRODUCTION**

### **1.1 General**

This facility was developed based on a need arising from clients with hydrocarbon contaminated soils resulting mainly from heating oil spills (e.g., from storage tanks and furnaces). The impacted soils will be transported to the facility for treatment.

This manual describes the operation of a treatment facility designed to serve primarily Iqaluit, with the potential of eventually serving other smaller communities in Nunavut. The treatment facilities are designed to provide an economical solution for the management of soils contaminated by petroleum hydrocarbons.

The process brings about a permanent solution to contamination issues. The contaminants are destroyed primarily through biological mineralization; but may also be treated by chemical oxidation. Physical treatment steps (e.g., screening and rock washing) will also be used to reduce volumes of soils to biotreated.

The treatment facility will use biopiles or landfarming to effect the elimination of contaminants and improve the overall quality of soils for re-use.

The soils to be treated will arrive by truck. Upon arrival, the soils will be directed either to the treatment pad or to the interim storage area.

If a weigh scale is available for the trucks, then empty trucks will be weighed at the beginning and end of each work day (or at the beginning and end of the work) to determine an average empty weight. All the trucks carrying soils/waste will be weighed prior to entering the Site to document the tonnage of materials received and processed at the treatment facility, for the purpose of reporting to regulatory authorities and invoicing. If a weigh scale is unavailable, then the volume of the truck box will be measured and invoicing will be based on the percentage of the filled truck box.

The treatment facility design is derived from the know-how of Qikiqtaaluk Environmental Inc.'s (QE) partner Sanexen Environmental Services Inc. (Sanexen) through their 22 years of experience in the execution of biotreatment projects, and from the combined experience of its shareholders and senior employees. Sanexen has performed on-site biotreatment projects for many clients over this period and manages and operates a permanent biotreatment facility in Saint-Amable, Quebec (*Solum Environnement (2010)*).

The target contaminants are mostly PHCs, including BTEX, MAHs and PAHs.

The treatment facility design is organized for optimal production, effectiveness, and simplicity. The selection of durable, long-life materials, involving greater capital costs, is a design choice that confers many operational advantages over the mid- and long-term. Such design choices translate into assets for effective operations.

The base scenario is for a treatment capacity of 1,000 m.t. per year. The facility includes a treatment pad and a storage/processing area. The latter will also be used for pre-treatment (i.e., screening, rock washing, separation of metals and debris, etc.) if necessary.

The system is designed to be operational during the summer and early fall seasons.

## **1.2 Location**

The facility is located on a property in northwestern Iqaluit. The approximate coordinates of the centre of the property are:

**Latitude:** 63°44'38.22" N

**Longitude:** 68°32'58.59" W

## **2. DESCRIPTION OF SYSTEM COMPONENTS**

Air is generally withdrawn from the biopiles using a piping network connected to a water recovery and circulation system. Air (heated or not) may also be pushed into the biopiles. A circulation of air is thereby established through the soils with blowers and the piping network. The piping network is composed of secondary aeration pipes (slotted or perforated) beneath the biopiles, and of main plain pipes that direct the fluids toward the water recovery system.

The air withdrawn from the biopiles is directed to an air/water separator. The collected water is transferred to a storage pond.

An underground leachate (water leached and drained from the soil/waste) catchment basin is used to collect water from the biopiles. A submersible pump in this catchment basin directs the water to the storage pond.

### **2.1 System Components**

Below is a list of the system's main components:

- Marine container with a blower, an electrical panel and fan for internal aeration;
- Water/air separator with automated water transfer to the storage pond;
- Submersible pumps;
- Water collection pond;
- Main plain pipe, 8" diameter with unions and caps (PVC, Schedule 40);
- Secondary pipes, plain and slotted, or perforated, with unions and caps (PVC, Schedule 40);
- Semi-permeable liners for covering the soil piles;
- Straps and anchors to hold the covering liners in place;
- Hot wire anemometer;
- Thermocouples and a digital reader.

A description is presented in the following sections.

#### **2.1.1 Container with the Blower**

The treatment of soils in biopiles requires an air circulation system that is sufficiently powerful to force the air through the semi-permeable liner, the soils and the piping. A calibration of the flowrate provided by the blowers is necessary to obtain the desired treatment performance; valves will help to adjust this flowrate according to the needs.

### 2.1.2 Air/Water Separator and Water Collection Pond

Some water will drain from the soils undergoing treatment and will be collected with the air withdrawn from the biopiles. More water is collected at the beginning of treatment. A cylindrical concrete catchment basin (a sewer-type concrete cylindrical manhole) is adapted to effect this task. Water is collected by gravity at the bottom, while air is drawn from an outlet at the top. A submersible pump, activated by a float, with a check valve at the discharge, periodically transfers the water to the storage pond where the water will be re-used to condition the soils. The air/water separator is positioned underground to allow gravity flow to it and to prevent freezing during cold weather operations.

A water collection pond is installed at the low point between the treatment pad and the processing/storage area. The pond is equipped with a submersible pump to direct water back onto the soil piles or to direct excess water to the water treatment unit.

### 2.1.3 Water Storage Pond

The water storage pond is watertight and constructed of a minimum 30 mil thick HDPE liner, or similar, covered and underlain by a protective geotextile liner. The water storage pond has a capacity of 41 m<sup>3</sup> to store enough water in the case of major precipitation. The leachate water from the soil pile and water from the air/water separators discharges to this pond.

The biopile normally operates with a deficit of water because of the moisture entrainment by the air that is circulated through the soils. However, a sufficient buffer capacity is needed for water because:

- Soils received may occasionally be wet;
- Soils are exposed to rain when the covers are removed during mechanical handling;
- A sufficient quantity of water is needed to condition the soils.

It should be noted that the mixing soils with amendments and the additive solution is normally delayed in the event of rain. In the event of excess water in the pond, water is sprayed on the drier soils during the following days. Excess water may also be directed to the water treatment unit.

#### 2.1.4 Secondary Air Piping

Secondary air pipes are positioned at the base of the soil pile. The 2" diameter perforated pipes have a predetermined profile and are made of PVC approved for temperatures up to 60°C. The sections are joined with synthetic rubber unions. These unions allow the desired flexibility and resilience for the assembly, particularly with respect to contraction and expansion due to temperature fluctuations. The perforation profile is designed to equalize the airflow rates across the width of the biopile.

The secondary pipes are covered with ¾" gravel that acts as a "plenum", or a transition between the soils and pipes and allow better air distribution.

#### 2.1.5 Treatment Pad

The maximum practical height for a biopile is 2 to 3 m. Piling soils higher than 3 m will lead to a faster compaction of the soils and a loss of efficiency (because of the loss of soil permeability to air and moisture), forcing a remixing of the soils (or more frequent remixing of the soils if the treatment period is long) for bulking purposes.

The treatment pad is watertight and constructed using a minimum 30 mil thick HDPE liner or similar, covered and underlain by a protective geotextile liner and further protected by a 0.3 m thick layer of clean gravel.

The outer edge of the treatment pad will have an elevated berm around the perimeter (6" above the interior grade) to prevent soil or water loss. The base of the treatment pad is built with a slight slope toward a water collection drain. The water is collected with a corrugated plastic agricultural drain that is installed in a depression along the berm. The drain is surrounded and covered with ¾" gravel and directs the collected water/leachate toward the water collection pond.

#### 2.1.6 Storage and Processing Area

The soil storage and processing area is used for the temporary storage and screening of soils as well as rock washing. This processing area may also be used for containerization of non-treatable soils prior to off-site shipment for disposal in authorized facilities.

The storage and processing area is also watertight and made of a minimum 30 mil thick HDPE liner, or similar, covered and underlain by a protective geotextile liner and further protected by a 0.3 m thick layer of clean gravel.

The outer edge will be composed of an elevated berm (6" above the interior grade) around the perimeter to prevent soil or water loss. The fourth side is elevated with respect to the opposite side so that leachate (water draining from the contaminated soils) flows by gravity toward the water collection pond.

The base of the pad is built with a slight slope toward a water collection drain. The water is collected with a corrugated plastic agricultural drain that is installed in a depression along the berm. The drain is surrounded and covered with ¾" gravel and directs the collected water/leachate toward the water collection pond.

#### 2.1.7 Covering Liners

Semi-permeable liners are used to cover the soils in treatment. One reason for using a cover is to ensure the confinement of contaminants, especially dust, that would otherwise be carried by wind erosion. The liner also acts as a vapour barrier for volatile contaminants. The pressure gradient across the liner, with the air moving downward through the interstices, prevents the loss of volatiles. Another important reason is to allow an even and appropriate diffusion, to the top of the biopiles, of air, to properly oxygenate the soils, and water, to maintain the desired moisture content in the soils.

The liners are woven to allow the infiltration of air and, as needed, a limited quantity of water for the biotreatment.

The black colour helps to absorb heat from sunlight and to maintain proper soil temperatures. The liners are also instrumental in preventing the soils from becoming too wet, which may slow or completely stop the treatment process.

#### 2.1.8 Storage Containers

Marine containers present on-site are used to store tools, spare pipes, fittings and various equipment necessary for the proper operation of the soil treatment facility.

### 3. DESCRIPTION OF TREATMENT OPERATIONS

The soil treatment facility operation requires the coordination of several aspects to optimize efficiency and throughput. Soils received by road would have a transport manifest completed in compliance with the regulatory and commercial requirements for the facility. An authorization number must be issued by the site manager or his delegate prior to transportation and prior to receipt of soils at the centre. This number allows for the tracking of the origin, anticipated quantities, type(s) of contamination and other relevant information concerning the soils. The shipper should notify the treatment centre a minimum 24 hours prior to site work. This delay is important to avoid the double handling of soils upon arrival. Without an authorization, the load of soils cannot be accepted and must be held over until it is accepted or returned. The person responsible for issuing the authorization should make the necessary arrangements with the shipment supervisor to adequately plan the receipt and acceptance of future soil shipments.

Once through the gate of the treatment facility, after the vehicle has been weighed, the truck driver remits the manifest to the foreman, or his designated alternate, so that the soils can be directed to the proper location according to nature and contaminants. The truck unloads the soils; alternately a backhoe transfers the load of soils. If insufficient information is known about the soils, the load is placed in the interim storage area. The interim storage area may also be used if the treatment pads are full. In all instances, the soil is inspected upon discharge to check for the nature of the soils, the extent of the contamination, the presence of mixed waste and/or debris, and any anomalies. Representative soil samples are taken and analyzed.

If enough information is known about the soils, they are immediately conditioned with the appropriate amendments and nutrient solution. The Site supervisor will log the location where the soils are unloaded and will create space allotments for soils of a similar nature to monitor large batches.

Finally the empty truck is weighed to obtain the net quantity of soils received.

During piling, composite samples are taken for each batch<sup>1</sup> of soils received. This composite sample is analyzed for internal purposes to obtain an average initial concentration for the soil undergoing treatment. A duplicate is refrigerated and stored and may be further analyzed for quality control purposes.

The conditioned soils are covered with a semi-permeable cover and, if there is a sufficient quantity of soils (more than ~500 m<sup>3</sup>), the blower is started to establish the desired air circulation through the soils.

---

1. A batch normally represents a quantity of soils of the same origin and nature; a batch can be 10 truckloads, for example.

After a treatment period pre-determined in accordance with the concentrations and other soil characteristics, the batches are again sampled and analyzed. Depending on the results, the soils will either be sampled according to the official protocol for declassification that denotes the end of treatment, or will be subjected to further treatment.

The system has been designed to operate 24 hours per day and 7 days per week.

### **3.1 Installation and Commissioning**

The installation of the various structures and equipment is fairly straightforward. The treatment and storage pads, as well as the water collection pond, are first constructed with proper slopes and peripheral berms. The air/water separator is positioned partly below ground, with the inlet positioned to respect the slope and orientation of the treatment pad's main air pipe.

The blower container is positioned and connected with 8" diameter main PVC piping for the processing of air. It is important to install drains at low points to prevent water accumulation and problems due to freezing. The piping is connected by screwing the threaded extremities, or the use of a union or a flange with a gasket.

The pumps and associated piping and valves are installed to direct the water to the collection pond and to circulate/pump out the water from the pond. Drains are installed at the low points of the circuit and vents at the high points of the circuit, again to empty the lines and prevent freezing, when necessary. A small air compressor may also be used to displace water from the lines, when necessary, with an air connection just downstream of the check valves.

The isolation valves, drain and vent valves, pressure and temperature gauges and tracing and insulation are installed where required.

Before system start-up, each of the components of the system is individually verified, and for each mode. A training period is also necessary with respect to health and safety at the site and to familiarize personnel with the system and the operating procedures, including spill response and other emergency response procedures. A hazop<sup>1</sup> study may also be conducted as part of the preparation (e.g., understanding what happens under conditions of low flow/high flow/no flow at various locations under various conditions and what problems/hazards may follow. The same can be performed for pressures, levels, concentrations, etc.).

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1. Hazard and operability



### **3.2 Procedures for System Operation**

The training program must be carried out so that operational procedures are well understood and subsequently implemented for the efficient operation of the treatment system. The system should be balanced to minimize pressure loss through the equipment train and ensure proper water drainage. System operation focuses primarily on the air blower, air/water separator, but also on the secondary piping and air control valves.

### **3.3 Sampling and Analytical Procedures**

Typically, one representative composite sample per 250 m<sup>3</sup> of treated soils, composed of 5 subsamples, will be collected for testing by a certified laboratory to quantify the concentrations of the target contaminants, with 10% duplicates for quality control, for acceptance of a batch of soils.

Daily or weekly sampling and testing may be performed on water and soils using on-site detectors, testing kits and other analytical instruments.

### **3.4 Treatment Procedures**

When running a soil treatment facility, operational principles and procedures should be respected to avoid compromises and errors that may occur with repeated arrivals. Interpretation of the results, piling, mixing, treatment and re-use/disposal are all operations that require a great deal of coordination.

#### **3.4.1 Assessment of the Results**

A proper assessment of the results is key to making good treatment decisions. Biological indicators (CO<sub>2</sub>, T, bacterial count, pH, nutrients, and moisture) should be monitored to ensure that operating conditions are optimal. Interim measurements of contaminant concentrations will help to plan if and where an additional treatment effort, such as the remixing of some soils with or without amendments, is warranted and to plan final sampling for the acceptance and removal of treated soils.

#### **3.4.2 Pile Preparation**

Piling simply consists of the reception of soils on the treatment pad, regardless of the origin of the soils. The soils are placed on a section of the pad, using the excavator, one load after another. This step is crucial for treatment and should be performed with care. The success of the treatment is largely due to the quality of piling. Taking the time to adequately place/position the contaminated soils in the pile decreases the possible requirement of repeatedly remixing the soils thereafter.

Piling is performed by section, between 2 secondary conduits. The excavator starts in one corner, on the side of the first section at the back of the treatment pad (where the 6" berm is located). The excavator fills the section up to the front of the treatment pad and continues to place another row of soil by starting at the back again.

The steps to properly set up a pile are the following:

- Prepare in advance the nutrients (powder or solution) and the pump and hose system to spray the liquid suspension on the soils;
- Place the organic amendment within reach of the excavator for a section on the pad to facilitate mixing the amendment with the soils;
- Sample a composite of the soils prior to conditioning;
- Add the nutrients. If the soils are too wet for spraying, place the solid fertilizer alongside the organic amendment for mixing into the soils; the fertilizer may be mixed beforehand with part of the organic amendment;
- Remove any large debris (metal, concrete, wood, etc.);
- Using the excavator, pick up the contaminated soils, with amendment laid on its surface, and place it in the designated area or section,
- Drop the contaminated soils from a height of approximately 3 m to fracture lumps and distribute/mix additives (amendments, nutrients);
- Pile soils to a maximum height of 3 m and flatten the top of the pile (3,2 m high because 0,2 m serves to fill depressions);
- Open the 2" valves on the secondary conduits when each 450 m<sup>3</sup> pile of contaminated soil has been placed in position in a section;
- Repeat these operations until the end of soil reception or until all spaces on the treatment pads are occupied.

Once the soils are in place, heavy machinery must not roll over the soils so as to maintain good bulking and to prevent soil compaction (thus reducing the circulation of air and the transfer of oxygen).

### 3.4.3 Covering Liners

When enough soils have been placed in piles, a covering liner is installed. The liner is installed using the excavator and 2 to 3 labourers. Sand bags are placed on the liner (top and base of the pile) to secure the liner and prevent the wind from displacing or tearing it.

Installing or removing the liners when there is a strong and/or unpredictable wind may constitute a safety hazard. If a liner is loose or has folds, the risk of tears is high. It is also why the top of the biopile should be as straight and as flat as possible.

The supervisor should be aware of the direction of the strong prevailing winds. The liners should be superposed over a one-metre width and in a way such that the wind will not enter the junction and lift a liner. The liners can be knit if there is a tear and can be repaired with glue-on patches if there is a hole.

### 3.4.4 Treatment

#### 3.4.4.1 *Biological Treatment*

Treatment begins when the soils are conditioned and forced aeration is initiated in the biopile. Much water is withdrawn from the soils during the first days of biotreatment. The collection pond should be maintained at approximately half level, if possible. It should not be completely emptied, as water will be needed during a dry period. If too full, there is a risk of overflow. Taking into account weather forecasts and the water inventory, it is possible to schedule the soil conditioning events so as to receive as much water as possible from the biopiles.

The soil temperature should increase significantly during the first week following conditioning. To monitor the evolution of bacteriological activity, daily temperature measurements are taken in the air withdrawn from the pile. A main goal is to increase microbial activity, associated with the growth (using hydrocarbons and nutrients) and internal metabolism (using mostly hydrocarbons) of the bacteria, so they use as many organic contaminants as possible as a source of carbon and food.

To obtain optimal treatment, the following conditions must be met:

- A constant supply of oxygen;
- Optimum moisture content;
- Ideal temperature;
- A sufficient initial population of micro-organisms; and
- A sufficient amount of nutrients (nitrate and phosphate).

The bacteria will consume the oxygen, nutrients (nitrate will also be used as an alternate oxidizer in parts of the soils that may not be sufficiently aerated) and the hydrocarbons or other contaminants to be biodegraded. The biological reaction will in turn generate additional biomass, heat and CO<sub>2</sub>.

The presence of CO<sub>2</sub> is a positive sign of biological activity. A 4-Gas detector is used to take readings of O<sub>2</sub> and CO<sub>2</sub> concentrations at connections along each valve of a secondary conduit.

#### 3.4.4.2 Chemical Treatment

Treatment of soils by chemical oxidation consists of adding and mixing an oxidizing agent (i.e., sodium persulfate) into the contaminated soil pile. The soil pile is then covered and left for a few weeks to passively treat. No air circulation is required.

#### 3.4.5 Sampling

After the anticipated treatment period, a batch of soils is subjected to sampling for internal monitoring. The covering liner(s) are removed. Each section is sampled by collecting 5 subsamples at varying locations and depths to make up a composite sample. The composite is homogenized in a metal pan. For volatiles, grab sampling is used (no subsamples and no compositing) to avoid loss of volatiles during handling. Coarse materials should be removed as per the sampling requirements of the regulatory agency. Duplicate samples are taken during final sampling. Washing/cleaning of the sampling tools is performed as per the requirements of the regulatory agency. Surgical-type nitrile gloves are used and, if they have touched the soils, changed before proceeding to the next section.

Organoleptic indications are documented (noting the appearance and odour of the soils in terms of contamination) and a portable instrument, such as a UV photo-ionization detector, or PID, is used to check for the presence of contaminants. The samples are brought to a table where an experienced technician (ideally the same technician for any given sampling campaign), within the hour, documents the observations and the PID readings.

This interim internal sampling and testing helps to determine which sections need to be mixed and conditioned again and which sections can be subjected to the final certified sampling.

When results indicate that all sections should be remixed/reconditioned, it is carried out as soon as possible.

When the final results indicate that the soils have met the clean-up criteria, the liners are again withdrawn to remove the treated soils.

#### 3.4.6 Soil Mixing

The methods of soil mixing are as diverse as there are operators, but some basic rules should prevail:

- Do mix each m<sup>3</sup> of the pile, but do not mix the same m<sup>3</sup> twice (unless it is very clayey and contaminated, in which case double handling is warranted);

- The excavator should not sit on mixed conditioned soils; if this occurs, the compacted soils should be bulked/mixed to a depth of 1 m;
- Remove significant sized debris or boulders;
- Do not mix together soils from separate soil batches;
- Do not mix together soils from different sections.

The most appropriate method for mixing and bulking the soils is for the excavator to back away from the mixed soils and onto soils that have yet to be mixed.

#### 3.4.7 Re-use or Disposal of the Soils

When the soils reach the treatment objectives, they are directed to their site of re-use (site of origin or other) or disposal (as daily soil cover for sanitary landfill sites, for example). While the soils are loaded on trucks, a visual inspection of the soils is nevertheless performed. Undesirable materials, debris or lumps of soil with leftover contamination may be segregated at that point. Debris may be disposed of separately while soils that may require further treatment are returned to the biopile.

### 3.5 Waste Management

Waste materials separated from the soils (segregated through screening or otherwise, when it is possible or practicable to do so) should be characterized according to the applicable regulations and should be handled and disposed of accordingly.

Hazardous and non-hazardous waste that cannot be cost-effectively dealt with through biodegradation are shipped off-site to an authorized facility.

### 3.6 Maintenance and Calibration

The system components require very little maintenance. The instruments and control devices, such as the gauges (pressure, temperature, level), the 4-Gas detector, PID and anemometer should be checked and/or calibrated every year (by the supplier or by a competent technician) or as per the supplier's recommendations. Spare equipment should be available (in stock or rented) to compare readings and verify the exactness of measurements.

#### 3.6.1 Equipment Maintenance

To maintain the efficiency and the safety of the biopile treatment system, all equipment must be inspected on a regular basis to confirm that it is in good operating condition.

The specifications, drawings and manuals pertaining to the various equipment, pumps, blowers, instruments and controls, valves, filters and so on, should be kept at the facility and at the office. Relationships must be established with critical suppliers (blowers) and subcontractors (electrician for example) to allow for rapid troubleshooting, repairs and replacement.

### 3.6.2 Instrument Calibration

Pressure gauges, for example, are checked against a similar instrument (the standard) whose exactness and accuracy have been verified and certified by the supplier. For example, if a reading of between 38 and 42 psig is obtained when the standard instrument indicates 40 psig, the pressure gauge is accepted for a tolerance of  $\pm 2$  psi. The zero is also verified (with the gauge disconnected). The readings obtained are recorded in the calibration log with the date and the initials or signature of the technician. An instrument is normally verified against a value that corresponds to a normal operating condition.

## 3.7 Monitoring and Management

The monitoring of each batch of soils is important to plan and optimize handling and to ensure conformity with the permitting requirements. Each load of soils received is recorded and monitored from the beginning to the end of processing. The records and documentation at the facility allow for the tracking of each m<sup>3</sup> of soils according to its origin. A digital database is used to manage and document the projects (each transaction with a client), soil movement, forms used for receiving and disposal, invoicing, the certificates of analysis and the treatment timetable. The use of different forms helps to trace pertinent information and becomes more important as the transactions grow in numbers.

The traceability of soils and the quality of records are hallmarks of a professional operation and are particularly important for facilitating inspections by the regulatory agency and client audits.

### 3.7.1 Reception of Soils

Regardless of the origin and the mode of transportation (truck or ship) of incoming soils, the transporter should have a manifest approved by the treatment facility. This manifest indicates the authorization number necessary for the acceptance of the soils, the origin of the soils, the types of contaminants, the expected levels of contamination (according to the classification corresponding to the invoicing unit rates), the approximate quantity, the nature of the soils and waste/debris that may be present, the sample numbers corresponding to laboratory analyses and the transporter's (and/or consultant's, if applicable) identification.

The project manager or client notifies the treatment facility supervisor 24 hours in advance of the shipments to be received on a given day. Proper planning minimizes double handling and standby expenditures.

The employee at the gate records the weight of the loaded truck upon entry at the weigh scale and signs the manifest. After he is notified, the supervisor confirms the area to which the truck driver should go, according to the nature of the soils. The supervisor meets the truck driver, checks and confirms the information, documents on the manifest where the soils were unloaded and signs once unloading has been completed.

The supervisor defines batches according to the origin and nature of the soils and the contaminants and level of contamination. For example, sand contaminated by VOCs will be segregated in a different batch from clay with heavy hydrocarbons, even if the soils originate from the same site.

At the conclusion of the day, personnel will compile all manifests, verify the conformity of the information in the reception log and complete/update the log used to follow soil batches. Mistakes can easily occur when more than a hundred trucks enter and exit the site over the course of a single day.

### 3.7.2 Uncharacterized Soils

Soils with no analytical results can sometimes enter the facility, as in the case of a spill response requiring immediate disposal. A different reception log is used for uncharacterized soils. These soils are directed to the interim storage pad. A trained technician inspects and samples the soils in accordance with the permit requirements and applicable regulations. The samples are accumulated in different piles according to origin and nature and according to the nature and concentrations of the contaminants. Each pile is covered until the laboratory results are obtained and the destination of the materials has been confirmed.

When the analytical results are obtained, the soils are classified. Soils that do not meet the facility's acceptance criteria are sent off-site to an authorized facility for treatment or elimination. Acceptable soils are directed to the treatment pad. These soils are then entered in the log for characterized soils, the same project number being maintained for soils of a given origin.

A colour code is used to identify the different piles on the interim storage pad. Each pile is identified with a wooden stake, coloured with spray paint, and the origin of soils is written with a permanent marker. Soils that do not meet the permit requirements and/or cannot be cost-effectively treated at the facility are disposed of.

Proper management of uncharacterized soils will contribute significantly to the facility's profitability.

### 3.7.3 Treatment

For monitoring and treatment management, 2 important tools are the *Treatment Schedule* and the *Batch Description* forms.

The *Treatment Schedule* shows a top view of the treatment pads. Each rectangle in a treatment pad represents a section between 2 aeration conduits. In each section, the batch number, level of contamination and the colour denoting the current step in the treatment process are indicated (*undergoing treatment, to be sampled, to be conditioned, accepted and to be removed*).

Each rectangle is linked to the *Batch Description* form. This form is used to show past and present information for a given batch. Analytical results (contaminant concentrations, moisture, pH, nutrients in leachate) are given, as well as pertinent data (amendments used, nutrients and biomass added, organoleptic indications, temperature and CO<sub>2</sub>). This information facilitates decision-making for the treatment strategy.

### 3.7.4 Re-use or Disposal

When it is time to remove soils that have met the desired criteria, the supervisor issues a manifest to the transporter and completes a disposal log for each outgoing shipment.

The manifest is the form that documents the return of the soils to the site of origin or to the designated site for re-use. Alternatively, it is the form used by the disposal site (for example, the sanitary landfill site that uses treated soils for daily cover over garbage). The batch number and sample identification (indicating soil acceptability) are provided on the form. Data is entered in the disposal log upon each shipment. The compilation of the data at the conclusion of each work day allows to closely monitor a given batch and to proceed with invoicing. The *Treatment Schedule* and the *Batch Description* are updated daily, establishing a good line communication between the treatment facility and the office. Monitoring of a given batch ends when all corresponding soils have been treated, accepted and transported to the re-use or disposal site.



## **OPERATION AND MANAGEMENT PLAN HAZARDOUS WASTE TRANSFER STATION**

*Document presented to:*



and



**FINAL**

February 2016

O/Ref.: QE15-102-2

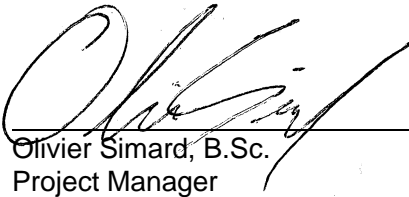


# OPERATION AND MANAGEMENT PLAN HAZARDOUS WASTE TRANSFER STATION

*Document presented to:*

***NUNAVUT WATER BOARD  
AND  
NUNAVUT IMPACT REVIEW BOARD***

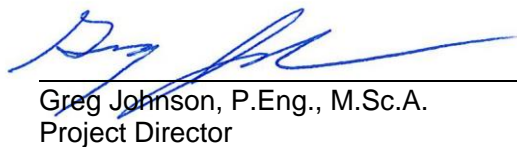
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**FINAL**

February 2016

O/Ref.: QE15-102-2

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## LIST OF ABBREVIATIONS

GN:	Government of Nunavut
HAZWOPER:	Hazardous Waste Operations
HDPE:	High density polyethylene
IMDG:	International Maritime Dangerous Goods
Imp. gal.:	Imperial gallon
INAC:	Indigenous and Northern Affairs CanadaCode
N.O.S.:	Not Otherwise Specified
PCB:	Polychlorinated biphenyls
pH:	Measure of acidity or alkalinity
RCMP:	Royal Canadian Mounted Police
TDG:	Transportation of Dangerous Goods
TDGR:	Transportation of Dangerous Goods Regulation
UN:	United Nations
WHMIS:	Workplace Hazardous Materials Information System

## **1. OPERATION AND MANAGEMENT PLAN**

### **1.1 General**

The facility was developed based on the need arising from the generation of various types of hazardous waste by clients who are not familiar or comfortable with the regulations pertaining to the proper packaging, safe storage, and authorized disposal of said waste. The hazardous waste is transported to the facility by the client or Qikiqtaaluk Environmental (QE) for temporary storage prior to being shipped off-site to authorized disposal facilities in southern Canada.

Hazardous waste will be stored inside 20-foot marine containers installed on-site. Approximately 10 to 15 marine containers will be used for waste storage purposes.

### **1.2 Location**

The facility is located on a property in Iqaluit. The approximate coordinates of the centre of the property are:

**Latitude:** 63°44'38.22" N

**Longitude:** 68°32'58.59" W

## **2. HAZARDOUS WASTE INVENTORY AND DESCRIPTION**

The main types of hazardous waste generated in Iqaluit that may be encountered at and managed by the transfer station are presented in Table 1.

**TABLE 1: Hazardous Waste to be Managed**

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Contaminated Water	Water is tested to meet discharge criteria.	Varies depending on the source of the contaminated water. Our treatment unit can treat a maximum of 15 m <sup>3</sup> /24 hrs.	<ul style="list-style-type: none"> <li>pH adjustment to precipitate metals, polymers used for flocculation;</li> <li>Oil/water separator;</li> <li>Particulate filter;</li> <li>ULTRASORPTION™ filter;</li> <li>Activated carbon filter.</li> </ul>	Discharge on land 30 m from a waterbody in a location approved by authorities having jurisdiction.
Waste Petroleum, Oil, and Lubricants (POL)	Hydrocarbons collected from the settling tank and oil/water separator or from other clients in Iqaluit.	Varies	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations or incineration on-site in a waste oil furnace.
Waste filter media from treatment units and used absorbent materials	<ul style="list-style-type: none"> <li>ULTRASORPTION™ (shredded absorbent);</li> <li>Granular activated carbon;</li> <li>Particulate filters; and</li> <li>Absorbents used during spill response.</li> </ul>	<ul style="list-style-type: none"> <li>Varies depending on volume of water to be treated and level of contamination;</li> <li>Maximum 5 m<sup>3</sup>/yr of each waste type.</li> </ul>	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations.
Sludge	Acid and or caustics used for pH adjustment, coagulating agent, metals.	<ul style="list-style-type: none"> <li>Varies depending on volume of water to be treated, metal concentration, and process efficiency;</li> <li>Estimated maximum 15 m<sup>3</sup>.</li> </ul>	<ul style="list-style-type: none"> <li>Dry;</li> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Disposal in local landfill if meet disposal criteria or ship south for disposal in accordance with regulations.
Contaminated Soils	Soils contaminated by organics and metals.	Varies, maximum 500 m <sup>3</sup> .	<ul style="list-style-type: none"> <li>Soils with organic contaminants: <ul style="list-style-type: none"> <li>treated on-site in a biopile or landfarm after volume reduction if treatment will allow the soils to meet guidelines within a reasonable period of time;</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Treated soils can be used as backfill or for other purposes approved by INAC and GN;</li> <li>All untreatable contaminated soils will be transported south for disposal in accordance with regulations.</li> </ul>

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
			<ul style="list-style-type: none"> <li>Untreatable organics (such as oil, grease creosote and PCBs): <ul style="list-style-type: none"> <li>volume reduction, packaging and labelling;</li> </ul> </li> <li>Metal soils: <ul style="list-style-type: none"> <li>packaged and labelled.</li> </ul> </li> </ul>	
Glycols	Antifreeze agents used in machinery and vehicles, as well as waste antifreeze used for de-icing purposes.	Varies according to client needs.	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations.
Batteries	Batteries from vehicles and other equipment.	Varies according to client needs.	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations.
Paint and/or paint related materials	Waste paint from building construction or demolition.	Varies according to client needs	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations.
Regulated Building Demolition Debris	Ballasts, light bulbs, capacitors, thermostats, asbestos.	Varies according to client needs.	<ul style="list-style-type: none"> <li>Segregation;</li> <li>Consolidation;</li> <li>Packaging and labelling.</li> </ul>	Ship south for disposal in accordance with regulations.
Biohazard, medical waste	Medical sharps	Varies according to client needs.	Biohazard packaged in proper Class 8 containers at hospital or health centre.	<ul style="list-style-type: none"> <li>Containers consolidated in a locked marine container;</li> <li>Ship south for disposal in accordance with regulations.</li> </ul>

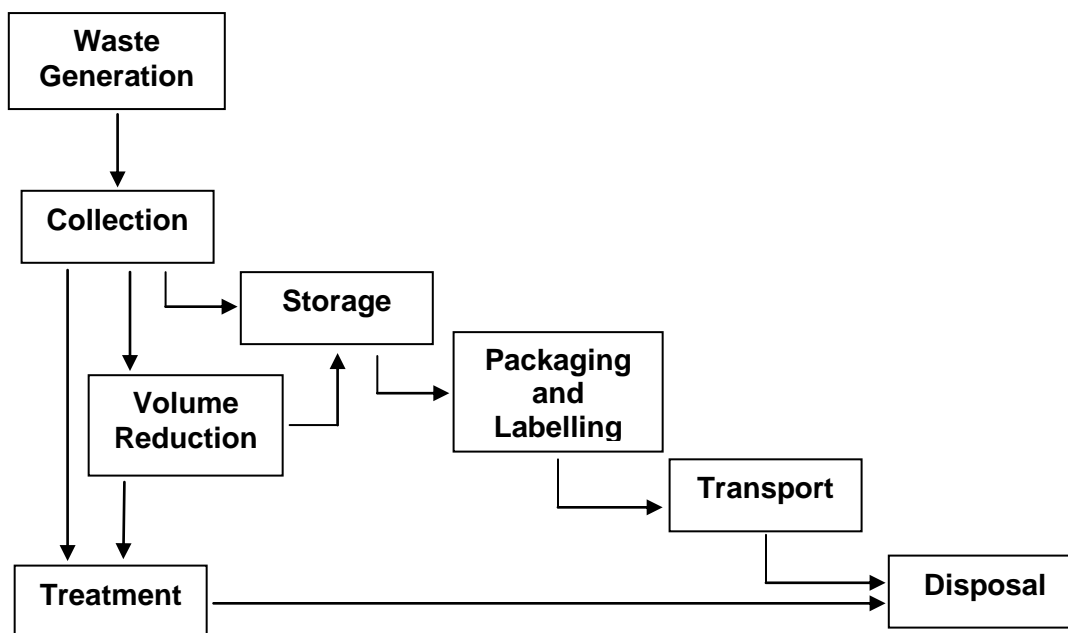
In the future, new types of waste materials may be generated in the community. These materials will need to be evaluated and analyzed to determine if they are hazardous and how they should be managed.



### 3. HAZARDOUS WASTE MANAGEMENT PROCEDURES

Hazardous waste management begins at the source when hazardous waste items are generated. Waste then proceeds through various steps until it is finally safely disposed of or eliminated. The steps for successful hazardous waste management can be summarized by the following flow chart.

FIGURE 1 : Hazardous Waste Management Steps



#### 3.1 COLLECTION

##### 3.1.1 Transfer Station

Hazardous waste is collected at the Transfer Station, which is a voluntary drop-off site. Waste materials are received by site personnel, inspected, identified (with client code and product ID), classified, segregated and placed on a temporary storage pad.

The Transfer Station will maintain flexible operating hours to allow drop-off of waste materials outside of regular business hours (9 a.m. to 5 p.m.). Waste management technicians will be available on-site to provide guidance and assistance to clients.

### 3.1.2 Pick-up Services

QE will also offer waste pick-up services. Transport of waste materials from client locations to the transfer station will be carried out by TDGR-trained drivers trained in vehicles equipped for the transport of such materials.

## 3.2 TREATMENT

The 2 types of waste that will undergo treatment at the transfer station are contaminated water and hydrocarbon contaminated soils. Treatment of water and soils are described in 2 separate Operation and Management plans.

## 3.3 VOLUME REDUCTION

Specialized equipment will be used to reduce the volume of aerosol cans and fluorescent tubes received at the transfer station.

An aerosol can recycling system will be used to safely puncture the cans. Residual liquid will then be drained into a drum (ready for transport) and the residual gas will be filtered through activated carbon. The 2 main types of residual liquids, flammable (e.g., paints, solvents) and corrosive (e.g., oven cleaners), are segregated and stored in separate drums. Empty aerosol cans (metal) can be further crushed and then recycled.

Fluorescent lamp crushers will be used to reduce the volume of tubes by breaking the tubes into fine glass particles inside a steel drum (ready for transport) while recovering the mercury vapour.

Spent gas filtration media will be sampled and analyzed and managed according to contaminant content. Non-hazardous spent filtration media may be disposed of at the municipal landfill site, while hazardous filtration media will be shipped south for disposal in authorized facilities.

### 3.4 STORAGE

Proper storage of hazardous waste is critical to ensuring the safety of users and site personnel, as well as regulatory compliance. Storage is a temporary operation that serves to accumulate waste until sufficient quantities are available for off-site shipment, and until marine transport is available (i.e., summer season). The proposed facility will be used for commercial purposes to store hazardous waste for periods that may exceed 180 days or more. Furthermore, the quantity of waste to be stored on-site will exceed the criteria set out in Appendix 8 of the *Environmental Guideline for the General Management of Hazardous Waste*<sup>1</sup>, namely for Class 3 materials, and possibly for Class 8 materials.

As stated in the *Environmental Guideline for the General Management of Hazardous Waste*, the proposed hazardous waste transfer station will meet the following requirements:

- The facility will meet all local and territorial sitting and construction requirements and be readily accessible for firefighting and other emergency response requirements. The local Fire Chief will be advised of the storage facility and its contents for emergency planning and response purposes.
- The facility will be secure. Access will be limited to employees who have been trained in safety and emergency procedures. These procedures will be documented and a copy will be made available to employees with access to the facility.
- Containers will be placed so that each can readily and easily be inspected for signs of leaks, corrosion or deterioration. Leaking, corroded or deteriorated containers will be immediately removed and their contents transferred to a sound container.
- Drainage into and from the storage facility site will be controlled to prevent spills or leaks from leaving and run-off from entering the site.
- All waste will be stored on a firm working surface that is impervious to leaks.
- Incompatible waste will be stored in a manner that contact in the event of a spill or accidental release is not possible.
- Emergency response plans will be developed in cooperation with local emergency response personnel and emergency response equipment will be locally available in the event of a spill, fire or other emergency situation.

#### 3.4.1 Transfer Station

Where possible, all hazardous waste received will be handled manually or with a backhoe loader for heavier items.

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1. Department of Environment, Government of Nunavut, Original: April 1999, Revised: January 2002, April 2010, October 2010

Hazardous waste will be stored in sound containers approved for the type of material to be stored. The containers will be stored at a location on the site where there is minimal traffic to reduce the risk of an accidental release of the stored material resulting from contact with the storage container. The containers will be placed within the fenced storage yard. The entrance to the yard, as well as each container, will bear placards indicating the waste categories and emergency telephone numbers.

Non-hazardous solid waste, such as contaminated soils, may be stored outdoors in waste wranglers that have been palletted and secured with strapping.

During the winter months, the yard will be cleared of snow to maintain access to the storage containers.

### 3.5 PACKAGING AND LABELLING

Stored hazardous waste will be packaged in appropriate containers. The selection of the appropriate containers helps to prevent leaks and spills that may result in human exposure or environmental release during the handling, storage and transport of materials. Therefore, containers must be:

- Made of materials compatible with the hazardous waste;
- Filled at, or below, the maximum capacity specified by the manufacturer;
- In good condition (i.e., no excessive denting, corrosion, or wear);
- Able to withstand normal handling (i.e., to prevent spills);
- Approved for transport.

Examples of appropriate containers for hazardous waste storage and transport are listed in Table 2.

**TABLE 2: Hazardous Waste Containers**

Type of Waste	Container
Small propane and butane tanks	<ul style="list-style-type: none"> <li>• Open top steel or plastic drums (45 or 75 Imp. gal.) with ventilation;</li> <li>• Waste wrangler (1 yd<sup>3</sup>)</li> </ul>
Aerosol cans	<ul style="list-style-type: none"> <li>• Open top steel or plastic drums (45 or 75 Imp. gal.) with ventilation;</li> <li>• Waste wrangler (1 yd<sup>3</sup>).</li> </ul>
Small batteries	<ul style="list-style-type: none"> <li>• Open top plastic pail with lid (5 Imp. gal.).</li> </ul>
Paint cans	<ul style="list-style-type: none"> <li>• Open top steel or plastic drums (45 or 75 Imp. gal.);</li> <li>• Waste wrangler (1 yd<sup>3</sup>).</li> </ul>
Fluorescent tubes and light bulbs	Intact tubes: <ul style="list-style-type: none"> <li>• Cardboard drum;</li> <li>• Original cardboard box;</li> </ul>

Type of Waste	Container
	Crushed tubes and bulbs : <ul style="list-style-type: none"> <li>• Open top plastic pail with lid (5 Imp. gal.);</li> <li>• Open top steel or plastic drums (45 or 75 Imp. gal.).</li> </ul>
Cooking oil	<ul style="list-style-type: none"> <li>• Closed top steel drums (45 Imp. gal.);</li> <li>• Open top plastic pail with lid and gasket (5 Imp. gal.).</li> </ul>
Waste oil, waste antifreeze, oily water	<ul style="list-style-type: none"> <li>• Closed top steel drums (45 Imp. gal.);</li> <li>• HDPE tote tanks on steel pallets (1000 L).</li> </ul>
Flammable liquids	<ul style="list-style-type: none"> <li>• Closed top steel drums (45 Imp. gal.).</li> </ul>
Petroleum hydrocarbon contaminated soils	<ul style="list-style-type: none"> <li>• Waste wrangler (1 yd<sup>3</sup>).</li> </ul>
Vehicle batteries	<ul style="list-style-type: none"> <li>• Waste battery wrangler (0.5 yd<sup>3</sup>).</li> </ul>
Oil filters, other oily solids	<ul style="list-style-type: none"> <li>• Open top steel drums (45 or 75 Imp. gal.);</li> <li>• Waste wrangler (1 yd<sup>3</sup>).</li> </ul>
Gas cylinders	<ul style="list-style-type: none"> <li>• No additional container required; however, all cylinders must have protective caps over the valves and must be secured in such a way as to remain upright at all times.</li> </ul>

Upon reception, hazardous waste containers will be identified with a waste tracking code that includes the client ID, product type, date received, and a sequential number. If waste materials are received in inappropriate containers, they will be repackaged in compliance with the TDGR. Containers will then be properly marked and labelled in accordance with the TDGR (i.e., Proper shipping name, hazard class, label and UN number).

### 3.6 TRANSPORTATION

The next step in the hazardous waste management process is transportation. The transport of hazardous waste from the storage site to the southern disposal facilities will be carried out in accordance with the TDG and IMDG Regulations, as well as the *Interprovincial Movement of Hazardous Waste Regulations*. Compliance with these Regulations will reduce potential hazards to humans and the environment during the handling and transport of hazardous waste.

It should be noted that not all types of hazardous waste are regulated while in transport. As all transportation will be down within Canadian Territorial Waters and only within Canada, once on land, Canadian TDG Regulations define regulated materials that are regulated for transport and how they need to be packaged and labelled.

The main transportation requirements of the TDG Regulations are:

1. Packaging;
2. Labelling and marking of containers and road vehicles;
3. Shipping document.

Containers and packaging used for transport will be the same as those used for storage, as described in Table 2, above.

The requirements for the labelling and marking of hazardous waste regulated for transport are:

- Proper shipping name written on the container or the hazardous waste label
- UN number written on the container or the hazardous waste label
- Hazard class label(s) affixed to the container
- Hazard class placards affixed to the road vehicle

Waste items identified as non-TDG regulated do not have a UN number or hazard class.

The shipping documents for hazardous waste shipped off-site will include the following information:

- Proper shipping name;
- UN number;
- Hazard class(es);
- Packing group (PG) number;
- Flashpoint (for Class 3 products);
- Marine pollutant (for applicable products).

Other information required on shipping documents include:

- Name and address of the shipper;
- Date of the shipment;
- Number of containers, and total quantity (kg or L);
- 24-hour telephone number where the shipper can be reached.

### **3.7 DISPOSAL**

Hazardous waste will be transported for disposal on the next available ship. The storage period for materials could be up to 9 months if storage occurs over the winter. Hazardous waste shipped out of Iqaluit will be transported by road to an authorized waste disposal facility in southern Quebec once it has arrived at the port and is ready for pick-up.

### **3.8 REGISTER AND RECORD-KEEPING**

Hazardous waste generators are required to create, provide and maintain the records that track waste from generation to ultimate disposal. The purpose of obtaining, maintaining and preserving these documents is to ensure that waste is properly managed and regulatory compliance requirements are met. The information and documentation is also useful in determining, and avoiding, potential liability issues through the transporter or disposal facility. Contrary to minimum regulatory requirements, permanently maintaining the required records and documentation is a prudent management practice. Registers are required to maintain an inventory of the waste to be disposed and who had access to it, and who was responsible for handling it at each step.

Inspections of the facility and stored waste will be performed and recorded in the registers a minimum of once each week.

Records will be maintained and indicate the types and quantities of waste being stored along with the date, type and quantity of hazardous waste brought into or removed from the facility.

A copy of the register will be kept on-site for a period of 2 years.

## 4. TRAINING

Appropriate training will be provided to ensure that workers involved in hazardous waste handling, storage, and transport understand regulatory requirements and methods to minimize the hazards and risks associated with the management of hazardous waste.

This training may include:

- WHMIS - GHS;
- Transportation of Dangerous Goods (TDG and IMDG);
- Handling, packaging, and storage of hazardous waste;
- Emergency response procedures;
- Instruction in the use of fire extinguishers;
- HAZWOPER.

Federal and territorial legislation requires employers to provide WHMIS training to employees who work with controlled products (i.e., hazardous products and waste).

The Transportation of Dangerous Goods Regulations (Part 6 - Training) states that:

*“A person who handles, offers for transport or transports dangerous goods must*

- a) be adequately trained and hold a training certificate in accordance with this Part; or*
- b) perform those activities in the presence and under the direct supervision of a person who is adequately trained and who holds a training certificate in accordance with this Part.”*

Dangerous goods include hazardous waste. This training is required for workers responsible for the pre-transportation packaging and labelling, road transport, and completion of paperwork completion of hazardous waste. TDG training must be updated every 3 years.

Operation- and site-specific training may be developed and delivered to employees to ensure that hazardous waste is effectively and safely managed. Employees who have not received appropriate training will not work in unsupervised positions until they have completed the training requirements to do so.



## 5. EMERGENCY RESPONSE AND SPILL REPORTING

Risks associated with the handling of hazardous waste include releases (i.e., spills and leaks) and fire (or explosion), and are referred to as events. A spill contingency plan will be filed with the Ministry, as required by the *Spill Contingency Planning and Reporting Regulations*.

The spill contingency plan specific to the waste transfer station facilities and operations will be designed to institute methods to prevent hazardous waste events, and to safely and effectively respond to such events. Namely, keeping a minimum quantity of hazardous waste in storage, for a minimum length of time, will reduce the likelihood and magnitude of events.

The maximum volume of liquid in a single container will be 1,000 L (tote tank) for non-regulated waste (used oil and antifreeze) and 205 L for regulated waste (flammable liquids). The spill of such volumes of liquid would be relatively easy to manage. Releases of solid hazardous waste are not usually problematic and are easily recovered.

Spills of hazardous waste will be managed internally by trained waste transfer station workers. In case of fire or explosion involving hazardous waste, the fire department will be immediately called to intervene. Emergency telephone numbers are listed in Table 3.

**TABLE 3: Emergency Telephone Numbers**

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

These emergency telephone numbers will be posted in prominent locations at the waste transfer station.

The waste transfer station will be equipped with:

- Telephone, mobile phone or radio capable of summoning emergency assistance;
- Portable fire extinguishers;
- Spill control equipment (i.e., spill kit).

This equipment will be kept at fixed locations to ensure availability in case of emergency. All personnel will be informed of the exact location and the appropriate use of this emergency equipment.

The Regulations state that:

*“The owner or person in charge, of management or control of contaminants at the time a spill occurs shall immediately report the spill where the spill is of an amount equal to or greater than the amount set out in Schedule B.”*

In the event of a hazardous waste spill, the site supervisor will immediately report the event to the NWT/Nunavut Spill Report Line at 867 920-8130.

## **APPENDIX P**

### **ENVIRONMENTAL PROTECTION PLAN**



**ENVIRONMENTAL PROTECTION PLAN**

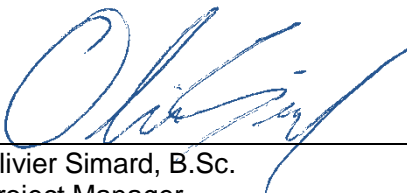
**QIKIQTAALUK ENVIRONMENTAL INC.**

**LOT 666, PLAN 1673**


**PARCELS Q AND O**

**ENVIRONMENTAL WASTE PROCESSING FACILITY**

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February 2016

O/Ref.: QE15-102-2

## NOTE TO THE READER

Qikiqtaaluk Environmental Inc. (QE) was established in Iqaluit, Nunavut in 2003. Its activities consist of the management of hazardous and non-hazardous waste, contaminated water treatment and contaminated soil management. QE will pursue its operations and add a soil treatment facility on the property located on Lot 666, Plan 1673, Parcels Q and O (the Site). This Environmental Protection Plan (EPP) describes these activities and how QE intends to safeguard against contaminants from escaping the Site. Monitoring wells, watertight lined cells and storage in marine containers are some of the measures taken by QE to prevent contaminants from escaping from the Site.

Hazardous waste (HW) is collected from various clients in Iqaluit and the surrounding communities. HW consists of, but is not limited to, waste oil, waste fuel, waste gasoline, hydrocarbon contaminated sludge, asbestos containing materials (ACM), lead paint and other lead containing materials, etc. These HWs are often improperly packaged and/or in containers of poor condition. QE's line of business consists of the identification, repackaging, marine transportation and final disposal of this HW. The Site will ultimately be used for that purpose.

Impacted water is often collected from spills, remediation sites or during the cleaning process of fuel storage containers. QE is licensed by the Nunavut Water Board (NWB) to collect, store, treat and discharge this water. The water treatment unit (WTU) consists of a metal treatment tank, water/oil separator and a series of filters activated by diaphragm pumps. The contaminated and treated water is stored in holding tanks with capacities ranging from 8,000 to 15,000 L. After treatment, confirmatory samples are taken and analyzed for comparison with the discharge criteria included in the NWB Licence. Following receipt of results within criteria, the clean water is then discharged to a discharge location authorized in our water license.

QE will treat hydrocarbon contaminated soils on-site using biological, chemical, and physical treatment techniques. The contaminated soils are screened (physical treatment) to remove larger materials (rocks) that do not hold contaminants. The finer materials are then placed on the biotreatment pad, which is comprised of a lined cell with a series of screened piping, to inject air into, or extract air from, the soils. Amendments are added to the soils to stimulate the bacterial activity that, over time, degrades and removes the contaminants from the soils (biological treatment). The soils are covered with a black tarp to maintain higher temperatures and minimize precipitation water infiltration. The treatment pad may also be used for treating soils by chemical oxidation.

The rocks obtained from screening are washed (physical treatment) to remove adherent fine soil particles then inspected and re-used on-site. QE will also launch a research and development project for new technologies that could provide better remediation rates in the Arctic. Monitoring measures implemented by QE consist of on-site monitoring wells to ensure that no contamination migrates off-site.

To facilitate understanding for readers who may need to focus on individual sections of this document, each section was written concisely but is, however, comprehensive enough to be read individually, at the risk of repeating key information within the document.

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## LIST OF ABBREVIATIONS

ACM:	Asbestos containing material
CCME:	Canadian Council of Ministers of the Environment
CEPA:	Canadian Environmental Protection Act
DND:	Department of National Defence
DoE:	Department of Environment
EPP:	Environmental Protection Plan
HC:	Hydrocarbon
HCW:	Hydrocarbon contaminated water
HDPE:	High density polyethylene
HW:	Hazardous waste
IMO:	International Marine Organization
INAC:	Indigenous and Northern Affairs Canada
MSDS:	Material Safety Data Sheets
NFC:	National Fire Code
NWB:	Nunavut Water Board
PCB:	Polychlorinated Biphenyls
PHC:	Petroleum hydrocarbon
PPE:	Personal Protective Equipment
ppm:	parts per million
SCP:	Spill contingency plan
TDG:	Transport of Dangerous Goods
TDGA:	Transportation of Dangerous Goods Act
TDGR:	Transport of Dangerous Goods Regulation
UN:	United Nations
WTU:	Water treatment unit

## **ENVIRONMENTAL PROTECTION PLAN OBJECTIVES**

The Environmental Protection Plan (EPP) was developed to provide prevention measures for potential environmental impacts associated with the development of Qikiqtaaluk Environmental Inc's (QE) activities. This plan also serves as the basic vehicle for ensuring that efficient and coordinated measures are provided in terms of detection, notification, recording, requests for assistance, containment and countermeasures for hazardous materials spills.

The EPP will be monitored by QE and will be used during daily activities in conjunction with the facility's drawings and specifications.

The EPP defines the following:

- Section 1: Operations regarding hazardous waste management, water treatment and soil treatment;
- Section 2: Environmental and other relevant jurisdictions, including legislation and regulations from federal, territorial and municipal authorities;
- Section 3: Protection measures required to avoid potential environmental impacts;
- Section 4: Emergency plans required to respond to situations which can adversely impact the environment.

The protection measures described in this document shall be implemented by QE to avoid potential adverse environmental impacts. These procedures were developed to take into consideration known and potential situations and conditions. However, if some procedures or protection measures prove to be impractical, imprudent or insufficient in field situations, appropriate modifications will be proposed by QE's Project Manager and approved by the concerned regulatory agency or its representative.

## **1. PROJECT OVERVIEW**

The Site covers an approximate area of 20,000 m<sup>2</sup> and bears the legal description Lot 666, Plan 1673, Parcels Q and O. It is located in the area designated West 40, within the boundaries of the City of Iqaluit. It has an M2 zoning classification, which, according to the City of Iqaluit zoning by-law, allows for heavy industrial activities. The Site is leased from the Iqaluit International Airport (IIA); however, it will soon be transferred to the City of Iqaluit. QE plans to reroute current drainage ditches and restrict public access to the Site through the use of 6 foot-high metal fencing with 3 rows of barbwire at the top of the fence. Surveillance using closed circuit cameras and movement-detecting exterior lighting will also be installed.

The Site has four neighbours:

- To the North: An empty industrial lot and an abandoned building;
- To the West: Sylvia Grinnell Territorial Park and empty industrial lots;
- To the South: A DND compound;
- To the East: Industrial lots leased to Hanson Construction Ltd. for cold storage and Wynburg Automotive for vehicle repairs.

An office space and warm storage area will be installed in trailers and/or modified marine containers. Heat will be provided by an oil-fired furnace. Heating oil will be delivered to the Site by UQSUQ Corporation, as is standard throughout the City of Iqaluit. Parking spaces and marine containers, to be used for cold storage, will also be part of the Site's infrastructures.

A road will be constructed and the entire Site will be graded to a slight eastern slope to allow rain or melting snow to be drained into the City of Iqaluit's current drainage pathways. Snow piling areas are also included to allow for activities to be carried out year-round.

### **1.1 Site Activities**

The on-site activities will be based to meet CCME or territorial environmental compliance (whichever is more severe). The following sections describe the major activities to be performed and the environmental requirements to be respected. The EPP will be monitored in conjunction with these documents to assess requirements of all activities. The major activities include the following:

- Hazardous waste management;
- Water treatment;
- Soil treatment.

## 1.2 Hazardous Waste Management

QE will implement appropriate waste management procedures for all waste collected during operations.

Non-hazardous solid waste generated as part of the on-site daily activities will be disposed of in the City of Iqaluit landfill. Non-hazardous materials expected to be encountered include: packaging materials, building demolition debris, metals, concrete and other debris.

Any hazardous waste generated by QE during daily activities (such as waste fluids and sludge) will be containerized and shipped off-site to authorized facilities.

Hazardous materials are defined as follows: *wastes or materials that are designated as hazardous under the Nunavut or Federal legislation, or as "dangerous goods" under the TDGA<sup>1</sup>*. Specifically identified and/or potentially hazardous materials that QE encounters during daily activities include: contaminated soils, hazardous building demolition debris, lead amended painted materials, batteries, asbestos, fuel tank sludge, solvents, waste fuels and lubricating oils and glycols. The requirements for the disposal of these hazardous materials are presented in Table 1.

**TABLE 1: Hazardous Material Requirements for Disposal**

Description	Management Procedure
<ul style="list-style-type: none"> <li>Liquids containing organic compounds with and without heavy metal contamination such as: <ul style="list-style-type: none"> <li>Cadmium (Cd) &gt; 2 ppm,</li> <li>Chromium (Cr) &gt; 10 ppm,</li> <li>Lead (Pb) &gt; 100 ppm;</li> </ul> </li> <li>Batteries;</li> <li>Tires.</li> </ul>	Consolidation, containerization, temporary on-site storage and off-site shipment to an authorized treatment/disposal facility.
Asbestos	Double-bagged and temporary on-site storage and off-site shipment to an authorized treatment/disposal facility.
<ul style="list-style-type: none"> <li>Fuels;</li> <li>Lubricating oils;</li> <li>Solvents and glycols;</li> <li>Fuel tank sludge.</li> </ul>	Consolidation, containerization, temporary on-site storage and off-site shipment to an authorized treatment/disposal facility.
<ul style="list-style-type: none"> <li>Hazardous Demolition materials;</li> <li>Paint, Lead amended paint and paint related materials</li> </ul>	Consolidation, containerization, temporary on-site storage and off-site shipment to an authorized treatment/disposal facility.
Biohazard, medical waste	Biohazard packaged in proper Class 8 containers at hospital or health centre. Containers consolidated in a locked marine container prior to shipment.

1. Transportation of Dangerous Goods Act, 192 (1992, c. 34)

Workers shall wear suitable PPE and use appropriate materials and equipment for the collection and sorting of hazardous materials.

Activities will take place on a lined area to prevent spills. Contact water will be collected and analyzed before treatment or discharge. Materials awaiting packaging will be covered to limit contact water. Adequate separation and storage will be maintained on-site to avoid product interaction.

### **1.3 Water Treatment**

In August 2014, QE was awarded a NWB Licence #1BR-THI1419 / Type "B" to carry out water treatment activities. Under this licence, QE is permitted to collect, store, treat and discharge HCW. HCW is collected by QE from fuel spill clean-up, tank cleaning or liquid waste consolidation activities. The HCW and treated water are stored in 4 different holding tanks, each with capacity ranging from 8,000 to 15,000 L. The tanks will be placed in a bermed area, as stated in the licence conditions, following INAC review. The bermed area will be designed to contain 30,000 L. More detailed information on WTU activities are included in the NWB licence.

QE is in the process of requesting an amendment to its NWB license that would allow for the management and treatment of water impacted by contaminants other than petroleum hydrocarbons (e.g., metals and other organic contaminants)

### **1.4 Soil Treatment**

Petroleum hydrocarbon contaminated soils will be treated on site using biological, chemical, and physical treatment techniques.

Contaminated soils will be temporarily stockpiled in a lined and bermed processing area. The processing area will also be used for physical treatment of soil involving soil screening to remove coarse materials followed by washing of the screening rejects. Water from the washing process will be redirected to the water treatment facility. Finer soil materials produced by the screening process are further treated by biological and/or chemical techniques.

Contaminated soils will be treated using biological degradation methods (landfarming or biopile) in a lined and bermed treatment area consisting of a watertight cell, usually made of an HDPE membrane or similar material. Biological soil treatment consists of facilitating bacterial activity within contaminated soils in order to reduce contaminants to a standardized concentration. Air, moisture and amendments are added to the soils and soil mixing is carried out on a regular basis. Biotreatment is effective in eliminating F1 and F2 HC fractions and to a lesser degree F3 fractions.

Soil treatment by chemical oxidation using an oxygen source other than air (e.g., hydrogen peroxide, sodium persulfate, sodium percarbonate) may also be conducted in the treatment area. Treatment by chemical oxidation is effective in eliminating F3 HC fractions.

QE will conduct remediation activities within the City of Iqaluit for soils impacted by hydrocarbons. The contaminated soils collected will be treated to meet the GN DoE *Guideline for Contaminated Site Remediation*.

Table 2 presents the generic contaminated soil remediation criteria that will be used for the soil treatment activities.

**TABLE 2: Summary of Tier 1 Criteria (mg/kg) for PHCs in Surface Soils**

Land Use	Soil Texture	Fraction 1 (C6-C10)	Fraction 2 (> C10-C16)	Fraction 3 (> C16-C34)	Fraction 4 (> C34)
Agricultural/Wildland	Fine-grained soil	210 (170a)	150	1,300	5600
	Course-grained soil	30b	150	300	2800
Residential/Parkland	Fine-grained soil	210 (170a)	150	1,300	5,600
	Course-grained soil	30b	150	300	2,800
Commercial	Fine-grained soil	320 (170a)	260 (230a)	2,500	6,600
	Course-grained soil	320 (240a)	260	1,700	3,300
Industrial	Fine-grained soil	320 (170a)	260 (230a)	2,500	6,600
	Course-grained soil	320 (240a)	260	1,700	3,300

Work related to the excavation and disposal of contaminated soils will be completed in accordance with the requirements of the GN DoE.

Should other contaminants such as untreatable chemicals or metals exceeding the applicable criteria's be found in some soils, they will be packaged and shipped south for final disposal after agreement with the generator.

Any HCWs produced from soil treatment activities will be collected and treated at the adjacent WTU.

## **2. JURISDICTIONS**

### **2.1 General**

QE will respect all applicable federal and/or territorial laws, regulations and requirements. QE will obtain the required permits, approvals and authorizations and will fully comply with said permits and approvals while conducting this work. QE will also work in close collaboration with the GN DoE and all other regulatory authorities to ensure full compliance. This will be applicable to all project phases.

### **2.2 Federal Jurisdictions**

Several federal acts, regulations, and guidelines, which are applicable across Canada, will affect project activities to be conducted at the Site. With respect to the activities QE will undertake at the Site, the most relevant of the federal acts, regulations and guidelines are described as:

- Canadian Environmental Protection Act: controls hazardous substances from their production and/or import, to their consumption, storage and/or disposal. This act also includes procedures to handle specified levels of PCB contaminated materials, and requirements for PCB storage facilities;
- Fisheries Act: protects fishes and their habitat from pollution and disturbance, and also protects fish movement disturbances. Fisheries and Oceans Canada reviews permit applications or restoration plans submitted by other agencies;
- Transportation of Dangerous Goods Act and Regulations: describe safety measures for TDG. The act applies to all handling of dangerous goods by any means of transport whether the goods originate from or are destined for anywhere in Canada;
- Interprovincial Movement of Hazardous Waste Regulations: ensures that the Canadian manifest tracking and hazards classification conditions for waste, formerly set out in the Transportation of Dangerous Goods Regulations, are maintained for the interprovincial movements of hazardous wastes.
- Canada Wildlife Act: ensures that the Government of Canada collaborates in the research and management of wildlife species normally under the responsibility of provinces and/or territories. This is particularly relevant for threatened, endangered and/or vulnerable species, such as polar bears and barn swallows, which seasonally move across various regulatory boundaries;
- Canada Shipping Act and Regulations: provides safety standards and/or pollution prevention and controls procedures for shipping activities in Canadian waters;
- Navigable Waters Protection Act: relates to all facilities required for navigation in Canadian waters;
- Canada Labour Act and Regulations: is the labour code which governs all federal employees or activities on Canadian owned or controlled lands. Private, provincial or territory employees are always submitted to such jurisdictions. The labour acts govern minimum wages, statutory holidays, and maximum work hours;



- *National Fire Code*: describes the requirements for fire prevention, safety in buildings, firefighting and the maintenance of fire safety equipment including fire extinguishers. Furthermore, the NFC establishes the procedures for the prevention, containment and fighting of fires originating outside buildings. The NFC also defines sets of standards for the storage and handling of dangerous goods, flammable liquids and combustible liquids;

### **2.3 Nunavut Jurisdictions**

In addition to the federal acts and regulations listed in Section 2.2, the Site activities will also comply with the following:

- *Environmental Guideline for Site Remediation* (2002). Government of Nunavut, Department of Environment;
- *Environmental Guideline for Contaminated Site Remediation*, (2003) Government of Nunavut, Department of Environment.

### **2.4 Other Applicable Jurisdictions**

HW to be shipped off-site for disposal will only be sent to licensed disposal facilities and/or waste handlers who comply with the applicable provincial requirements. The Certificates of Authorization for all facilities selected to receive HW originating from the Site will be provided upon request.

### **2.5 Permits**

QE will obtain the necessary permits, authorizations, certificates and approvals related to site operations namely the handling, transport and disposal of hazardous materials. Table 3 presents a partial list of these requirements.

**TABLE 3: Applicable Permits and Authorizations for the Site activities**

<b>Authorizations or Permits</b>	<b>Regulatory Authorities</b>	<b>Activities</b>	<b>Permitting Agencies</b>	<b>Applicant</b>
Development Permit	Iqaluit Zoning By-Law	Land development	Municipality of Iqaluit #DP15-024	QE
Nunavut Water Board License	NLCA <sup>1</sup>	Treatment of Contaminated Water Hazardous Waste Management and Soil Treatment	Nunavut Water Board License #1BR-THI1419	QE
Nunavut Impact Review Board Decision	NLCA <sup>1</sup>	Treatment of Contaminated Water Hazardous Waste Management and Soil Treatment	Nunavut Impact Review Board	QE
Nunavut Planning Commission Decision	NLCA <sup>1</sup>	Whole project	Nunavut Planning Commission	QE
Transportation Permit	TDGA, IATA <sup>2</sup> Dangerous Goods Act	Sea lift and/or air transport of hazardous waste	Transport Canada	QE and Subcontractors
Hazardous Waste Management Facility Registration	Department of Environment	Hazardous Waste Management Facility	Department of Environment NUF#400006	QE
Hazardous Waste Receiver Registration	Department of Environment	Hazardous Waste Management Facility	Department of Environment NUR#300001	QE
Land Lease	Iqaluit International Airport	Land Development	Nunavut Airport Services Ltd.	QE

1. Nunavut Land Claim Agreement
2. International Air Transport Association

### **3. ENVIRONMENTAL PROTECTION**

#### **3.1 Objectives**

The procedures and requirements provided hereinafter are intended to protect the environment, ecosystem parameters and human receptors at, and immediately surrounding the Site. It also describes the monitoring measures to be followed from year to year and the procedures to follow if a doubt arises that contamination may have entered the environment.

##### **3.1.1 Hazardous Waste Management Facility**

In order to avoid environmental impact, site operations shall require specific procedures and monitoring:

- Workers shall be required to wear suitable PPE while handling HW materials;
- Hazardous materials processing areas shall be developed and properly maintained for hazardous materials management;
- Hazardous materials processing areas shall be located at a minimum distance of 31 m from the nearest water body.
- The movement of heavy machinery, vehicles and equipment between the hazardous materials processing areas and other work site locations shall be controlled to prevent cross contamination;
- The hazardous materials processing area shall be constructed with an impermeable liner covered with 0.3 m of gravel. In the eventuality of a contaminant spill, the liner will act as a barrier preventing contamination from escaping the area;
- Contact water shall be collected and analyzed prior to treatment or discharge;
- Any ignition sources such as smoking, hot work or torch cutting shall be prohibited within a 5 m radius of the hazardous materials processing area;
- Hazardous liquids shall be stored in suitable containers (e.g., 205 L drum, UN-approved 20 L pail with lid, etc.);
- Solid hazardous waste shall be stored in suitable containers such as Quatrex™ bags, covered open-top drums or marine containers;
- A site-specific SCP has been developed and is attached to this EPP;
- Firefighting equipment shall be made available for immediate access near the hazardous waste processing and storage location;
- Drums containing hazardous materials, including waste fuel, shall be identified, labelled and stored in such a way as to prevent spills. Labels shall provide health, safety and environmental information;
- MSDS for all hazardous products used and stored on site will be made available to personnel;

- Hazardous waste storage facilities shall be inspected a minimum of once a day during business days;
- Emergency spill equipment including fuel pumps, recovery drums, containment booms and other sorbent materials shall be available on-site. QE is responsible for informing the fire department of stored waste so that they may respond appropriately in case of an emergency and for maintaining enough equipment on-site to clean up a 1,000 L spill in the hazardous waste storage area (see the Spill Response Procedure presented in Section 4);
- A detailed inventory will be kept and made available to emergency response crews.

### 3.1.2 Transportation of Hazardous Materials

- The operators of equipment used to haul waste will be experienced, trained and licensed;
- When required, hazardous materials shall be shipped off-site in accordance with the following:
  - provisions from the TDGA, as well as the IMO and the IATA dangerous goods regulations,
  - hazardous materials shall be packaged according to requirements specified in the TDGRs,
  - the prescribed documents shall be obtained and accompany any materials classified as hazardous by the TDGA. These documents shall provide the names and addresses of the shipper (generator), consignee (receiver) and all carriers,
- Specific provisions for hazardous materials in quantities larger than 5 kg or 5 L, and for wastes that contain more than 50 ppm PCBs, shall apply as follows:
  - QE shall complete a waste manifest for each shipment. This document shall follow the shipment to its final destination,
  - the origin and destination of the shipment shall be defined. The nature and quantity of dangerous goods shall also be given (shipping name, classification, UN number, packaging group, subsidiary risk, number and kind of packaging, and gross weight),
  - manifests shall be transmitted by the shipper to the initial carrier. When dangerous goods arrive at their final destination, the receiver shall send, within 2 working days, a signed copy of the manifest to the shipper;
- Unknown waste that may require off-site shipment shall be characterized according to regulations to determine whether it must be considered as a transport hazard;
- Hazardous materials to be shipped off-site shall be packaged in accordance with the TDGA, IMO and IATA regulations, which define criteria based on risk;
- Hazardous material containers to be shipped off-site must be provided with prescribed labelling:
  - packages shall be identified according to the hazardous item's class and division. It should be noted that requirements may differ between the IATA, IMO and TDGA regulations. Label or placard designs are unique to each classification,
  - packages shall be labelled on a minimum of 2 sides of the container and the nature of the dangerous goods shall be clearly identified on the label (i.e., shipping name, UN number, classification, packaging group);

- All materials known to exceed the CEPA criteria shall be containerized in selected rigid sided containers that comply with the TDGA and shall be stored at the temporary staging area;
- Fluids (including water) resulting from the cleaning (i.e., decontamination) of equipment and heavy machinery used in the hazardous waste management areas shall be contained, tested and treated, as per regulations;
- Hazardous materials, including hazardous drum contents, shall be treated and disposed of in accordance with regulations;
- Hazardous materials (fluids and solids) shall be removed and placed in storage containers for shipment to an authorized disposal facility.

### 3.1.3 Water Treatment

Water treatment activities are governed and regulated through QE's NWB License. The main mitigation and safety measures are:

- Treated water must meet discharge criteria;
- Treated water discharge location must be approved by an INAC field officer;
- INAC field officer must be given a minimum 10 days' notice before every discharge event.

### 3.1.4 Soil Treatment

Hydrocarbon impacted soils will be treated on-site using physical, biological and chemical soil treatment techniques. Measures to avoid contaminants escaping are:

- Containment cells shall be watertight and made of a minimum 30 mil thickness HDPE liner or similar, covered and underlain by a protective geotextile liner;
- The processing area and the treatment pad are composed of a containment cell, as described above, which is further protected by a 0.3 m thick layer of clean gravel;
- A lined water collection pond shall be located between the treatment pad and the processing area;
- The processing area, water collection pond and treatment pad will be components of the same watertight liner, thus avoiding contaminants to escape while soils are being processed;
- The outer edge of the entire processing area, water collection pond and treatment pad will be composed of an elevated berm (6-inch above grade) to prevent loss of soil or water;
- Precipitation runoff water accumulating in the collection pond will be reused as part of the soil treatment process; any excess water will be analyzed to determine whether it is to be treated or discharged;
- Soil piles on the treatment cell will be covered with a semi-permeable liner to minimize the amount of snowmelt or rainwater to be collected;
- Visual inspection of the cells will occur every business day;

- Upon completion of a soil treatment batch, soil sample laboratory results confirming that quality criteria are met will be submitted to GN DoE. Only upon receipt of an approval from the regulatory agency will QE remove the soils from the treatment pad.

Note that biological soil treatment **does not** represent a deposit of waste, since the contaminated soil is separated from the environment by the watertight liner. Biological soil treatment activities will not require the use of water from an external source. Water collected in the collection pond will be reused to moisten the soils, as required. **No other source of water will be used.**

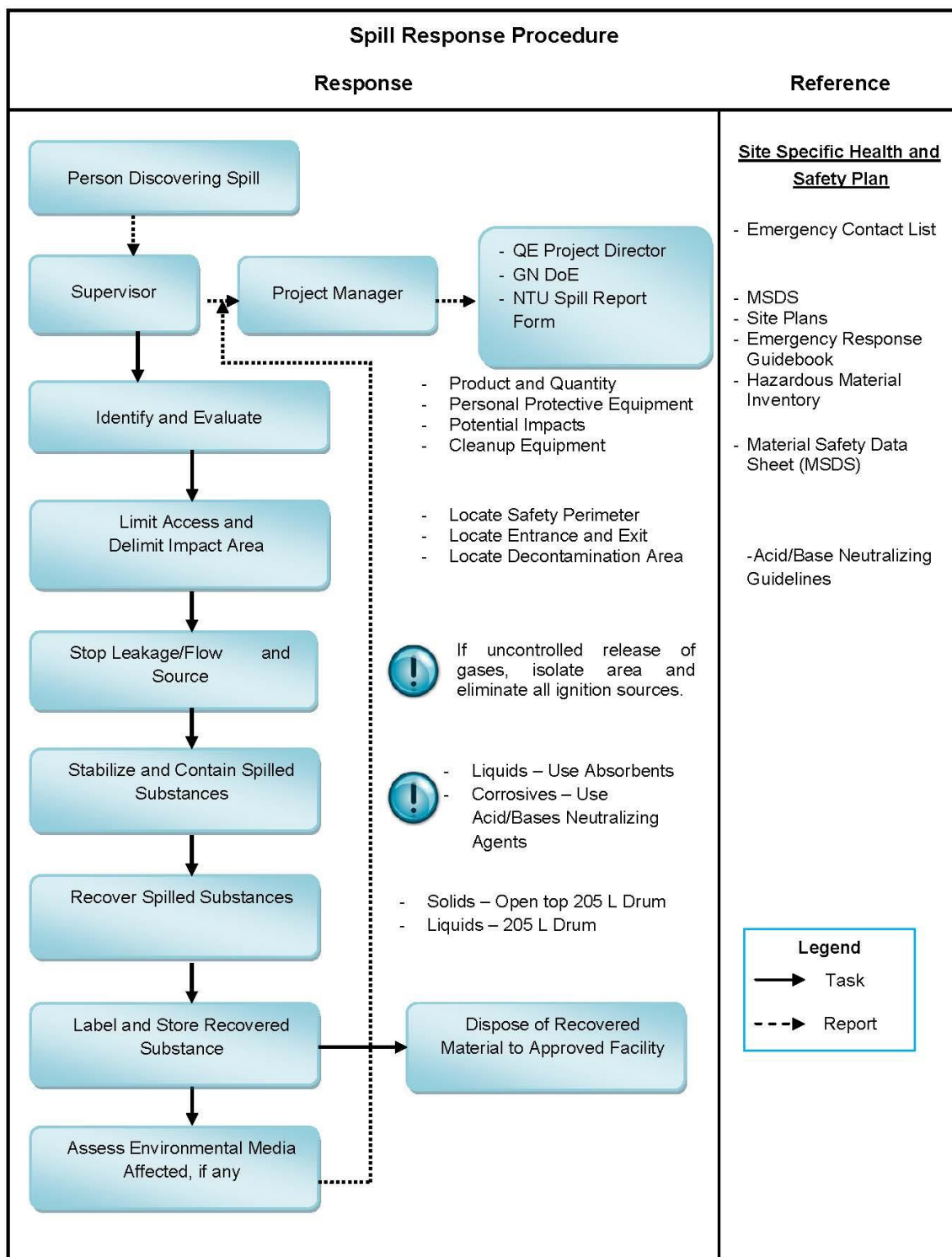
### 3.1.5 Site Monitoring

In order to ensure that the EWPF activities do not have a negative impact on the surface waters next to or in the EWPF area, a water monitoring program will be conducted.

- Groundwater monitoring wells will be installed around the site, one upgradient and 3 downgradient of the operations. Water samples will be collected once a year, at the end of August, and analyzed at a certified laboratory;
  - Coordinates where the monitoring wells will be installed are as follows:
    - Monitoring Well 1 (MW-1): 63°44'38" N, 68°33'00" W
    - Monitoring Well 2 (MW-2): 63°44'35" N, 68°32'58" W
    - Monitoring Well 3 (MW-3): 63°44'37" N, 68°32'55" W
    - Monitoring Well 4 (MW-4): 63°44'39" N, 68°32'53" W
- Surface water from the ditches will be sampled at 2 locations on a yearly basis, at the end of August. One sample of water entering the site (upgradient) and one sample leaving the site (downgradient) will be collected and analyzed at a certified laboratory;
  - Coordinates of the water quality sampling locations are as follows:
    - Entrance to the site (Point I): 63°44'38.82"N, 68°33'2.45"W,
    - Exit from the site (Point O): 63°44'39.27"N, 68°32'52.00"W;
- The water samples collected as part of the water monitoring program will be analysed at a minimum for the following parameters:
  - oil and grease,
  - benzene, toluene, ethylbenzene and xylenes,
  - biological oxygen demand,
  - total suspended solids,
  - glycol,
  - polycyclic aromatic hydrocarbons,
  - metals,
  - other parameters as required by the water licence.

## 4. SPILL RESPONSE PROCEDURE

Find below the spill response algorithms to be followed by all QE employees upon discovery of a hazardous material spill. A complete Spill Contingency Plan has been prepared and is available upon request.



## **APPENDIX Q**

### **ARCHAEOLOGICAL RESEARCH**



## Kellie Anne Fillman

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**De:** Perry, Steve <sperry2@gov.nu.ca>  
**Envoyé:** 12 janvier 2016 10:45  
**À:** Olivier Simard  
**Cc:** gjohnson@qenv.ca; LeBlanc, Sylvie  
**Objet:** RE: QE - Archeological sites

Hi Olivier,

I've reviewed existing data sources and can confirm that no known heritage resources exist within the lot on the map you provided.

Please note, however, this does not preclude the existence of non-recorded heritage resources at that location.

Should you have additional questions please contact me.

Thanks,  
Steve



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Building Nunavut Together  
Nunavutluuqatiglingniq  
Bâtir le Nunavut ensemble

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Department of Culture and Heritage  
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Ministère de la Culture et du Patrimoine

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Steve Perry  
ᑭᑎᑎᑦ ᑭᑎᑎᑦ ᑭᑎᑎᑦ - Geographical Information Systems Officer  
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If you would like this correspondence in any other official language, please let me know  
Titigqat piumarupkit aalaakkut ilitariyauhimayutigut uqauhikkut, unniutitjavangma  
Si vous souhaitez correspondre dans une autre langue officielle, veuillez nous en faire part

---

**From:** Olivier Simard [<mailto:osimard@qenv.ca>]  
**Sent:** Monday, January 11, 2016 4:28 PM  
**To:** Perry, Steve; Cloutier, Stephane  
**Cc:** [gjohson@qenv.ca](mailto:gjohnson@qenv.ca)  
**Subject:** TR: QE - Archeological sites

Hello,



I am not sure if IHT has the authority to provide a final assessment statement in regards to the existence of archaeological sites. I recommend that you check in with the Territorial Archaeologist Sylvie LeBlanc ([sleblanc1@gov.nu.ca](mailto:sleblanc1@gov.nu.ca)). She is also cc'd to the email.

However, based on the resources that I can access I could not find any evidence that there was an archaeological site on the particular area that you marked. Maybe this can serve as a tentative answer until Sylvie provides you with a final assessment.

Cheers,  
Torsten

---

**From:** Olivier Simard [<mailto:osimard@genv.ca>]  
**Sent:** December-09-15 9:32 AM  
**To:** Torsten Diesel  
**Subject:** QE - Archeological sites

Good morning Torsten,

QE is in the process of developing a new lot at West 40 area (see map attached). Could you tell me if, by any chance, you know if there is archeological sites or archeological studies related to the Site outlined in red on the map? It is part of a request from the NIRB in our land development application. We would like to submit this application next week so the sooner you can answer me or redirect me to someone who could help me the better.

Thank you in advance and have yourself a great holidays season!

Cheers!

**Olivier Simard B.SC.**

Project Manager - Northern Projects



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Iqaluit Ln

Hubbard

Akiliq

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Date des images satellite : 31/7/2011 63°44'37.57"N 68°32'54.34"O élév. 37 m altitude