REPORT

Spill Contingency Plan

Coffee Gold Mine

Submitted By:

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REVISION TRACKING LOG

Revision Tracking Log			
Version	**Date**	**Section Updated**	**Description of Update**
0	November 2023	-	First submission of the Spill Contingency Plan
1	September 2025	5.0	Updated in response to QML IR1 - Added reference to Emergeny Response Plan for spills which have ignited response procedures.
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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
CANUTEC	Canadian Transport Emergency Centre
CCME	Canadian Council of Ministers of the Environment
ECCC	Environment and Climate Change Canada
ERC	Emergency Response Coordinator
ERT	Emergency Response Team
GMPs	Good Management Practices
H&S	Health and Safety
HDPE	high-density polyethylene
HLF	Heap Leach Facility
LNG	liquefied natural gas
LOM	life of mine
MSDS	Material Safety Data Sheets
NAR	Northern Access Route
Newmont	Goldcorp Kaminak Ltd., a wholly owned subsidiary of Newmont Corporation
PPE	Personal Protective Equipment
ROM	Run of mine
SCBA	Self-contained breathing apparatus
SCP	Spill Contingency Plan
SER	Sustainability and External Relations
SOPs	Safe Operating Procedures
TECP	Totally-Encapsulating Chemical Protective
TDG	*Transportation of Dangerous Goods Act*
WHMIS	Workplace Hazardous Materials Information System
WRSF	Waste Rock Storage Facility

LIST OF SYMBOLS AND UNITS OF MEASURE

Symbol / Unit of Measure	Definition
%	Percent
km	Kilometres
L	Litre
m	Metres
Mt	Million tonnes
t/d	tonnes per day

INFORMATION REQUIREMENTS FOR QUARTZ MINE LICENSE AND WATER LICENSE

Information Requirement	Location in this Plan
Table of Concordance	Appendix C
Revision Log	Page i
Provide a brief description of what fuels, chemicals, and other materials (e.g., oils, solvents, and antifreeze) are handled at site and where they are typically used and/or stored. Identify the locations of hazardous waste storage areas, areas of use, and spill kits.	Section 3: Spill Definition and Categories
Provide a summary of all the reporting thresholds for chemicals and fuels used on site. Include a description of how non-reportable spills will be handled and how these incidents are recorded.	Section 3.2: Non-Reportable Spills Section 3.3: Reportable Spills
Identify the supplies and equipment that are available for spill responses, and the location where equipment and supplies are found. Provide a list of all supplies that are contained in spill kits, any additional supplies that are in the kits at stationary caches, and the frequency which the supplies are inventories and replenished. Identify the equipment that is available for responding to larger spills.	Section 4.2: Spills Supplies and Equipment
Identify what should be done by the first worker attending a spill site. Typically, this will include such actions as assessing whether it is safe to take any action; stopping the spill and/or turning off equipment; establishing basic containment to keep the spilled material from spreading; getting help and/or reporting the spill to a supervisor so they can send help and initiate reporting, etc.	Section 5.1: Spill Response Procedures: Non-Emergency Section 5.2: Spill Response Procedures: Emergency
Describe the containment protocols for each spillable material in soil, water, snow, and ice. List spill response actions for each scenario, taking special note of any unusual situations or chemical reactions that may occur. Guidelines for selecting containment techniques on water and land must also be provided.	Section 5.4: Containment and Cleanup Procedures
Include the clean-up protocols for each spillable material in soil, water, snow, and ice. Provide a description of how collected spilled material, used spill response equipment, and contaminated soil and snow/ice will be handled, stored, and treated. Identify how it will be demonstrated that all contaminated soil / water / etc. has been captured. Include a description of the spill response procedure for accidents/incidents that have been ignited.	Section 5.4: Containment and Cleanup Procedures
Provide a chart that outlines the responsibilities of various workers in the event of a spill. A summary of the roles and responsibilities of the employees involved in spill clean-up and reporting must also be provided in this section. Include a list of all off-site resources available in the event of a major spill.	Section 5.2: Spill Response Procedures: Emergency

Information Requirement	Location in this Plan
Describe the sequence of reporting that will be followed to ensure an efficient and effective response occurs and outline the agencies with which spill reports must be filed. Include a list of reporting and emergency contacts and their contact information.	Section 6: Internal and External Reporting
Describe the spill response training that all employees must take and the frequency that training is to be updated / reinforced. Identify the different training opportunities that are mandatory and/or available for the different respondents to spills on site.	Section 8: Training Requirements
Describe the best management practices that relate to the storage of fuel, chemicals, and hazardous substances.	Section 4.4: Hazardous Materials Waste and Hazardous Materials Management Plan
Describe the training that will be provided for employees who handle, transport, or store fuel and lubricants and the procedures that will be followed. Include the procedures in place for fuel spill prevention and protection. Provide the procedures in place to prevent the accidental release of fuel to the environment.	Section 8: Training Requirements
Provide an outline of responsibilities for site services staff and environmental department staff with regard to inspections that will be carried out to identify if there are any leaks, losses, blockages, or other equipment issues. Also identify any intrinsic monitoring / alarm systems.	Section 7: Routine Monitoring and Maintenance
Outline the procedures to identify any leaks, spills, stains, etc. in or around fuel, chemical and hazardous material storage, and transfer areas. Also identify any intrinsic monitoring / alarm systems.	Section 4.5.1: Transferring to Tank Farm Section 7: Routine Monitoring and Maintenance
Provide a brief outline of the procedures that are in place to ensure proper waste management and segregation, including any intrinsic monitoring / alarm systems	Waste and Hazardous Materials Management Plan

YWB EMR Plan Requirements Applicable to the Water Management Plan		
Information Requirement	**Location in this Plan**	**Referenced From**
Describe the procedures to be used to prevent spills of hazardous materials or special wastes, and the procedures to be followed in the event of a spill. If a separate Spill Response Plan or Emergency Response Plan has been prepared to address these elements, refer to it here.	Section 4.2: Spills Supplies and Equipment Section 5: Spill Response Action Plan	Cyanide Management Plan Waste and Hazardous Materials Management Plan

YWB EMR Plan Requirements Applicable to the Water Management Plan		
Information Requirement	Location in this Plan	Referenced From
Provide designs for processing facilities including flow sheets, sizing, capacities, process controls and containment systems. Also provide details about how health and safety issues have been addressed, including air quality and air handling. Describe how spills or releases of process solutions will be contained. Provide details about reagent storage and handling.	Section 5.0: Spill Response Action Plan	Heap Leach and Process Facilities Plan
Identify each hazardous material used at the mine site, by chemical and common names as applicable. Include all Material Safety Data Sheets (MSDS) and ensure these are updated in accordance with all relevant regulations. Identify all locations where copies of the MSDS and this Hazardous Materials Management Plan are available on site.	Section 4: Good Management Practices Section 3.4 Hazardous Materials	Waste and Hazardous Materials Management Plan

1.0 INTRODUCTION

1.1 Project Overview

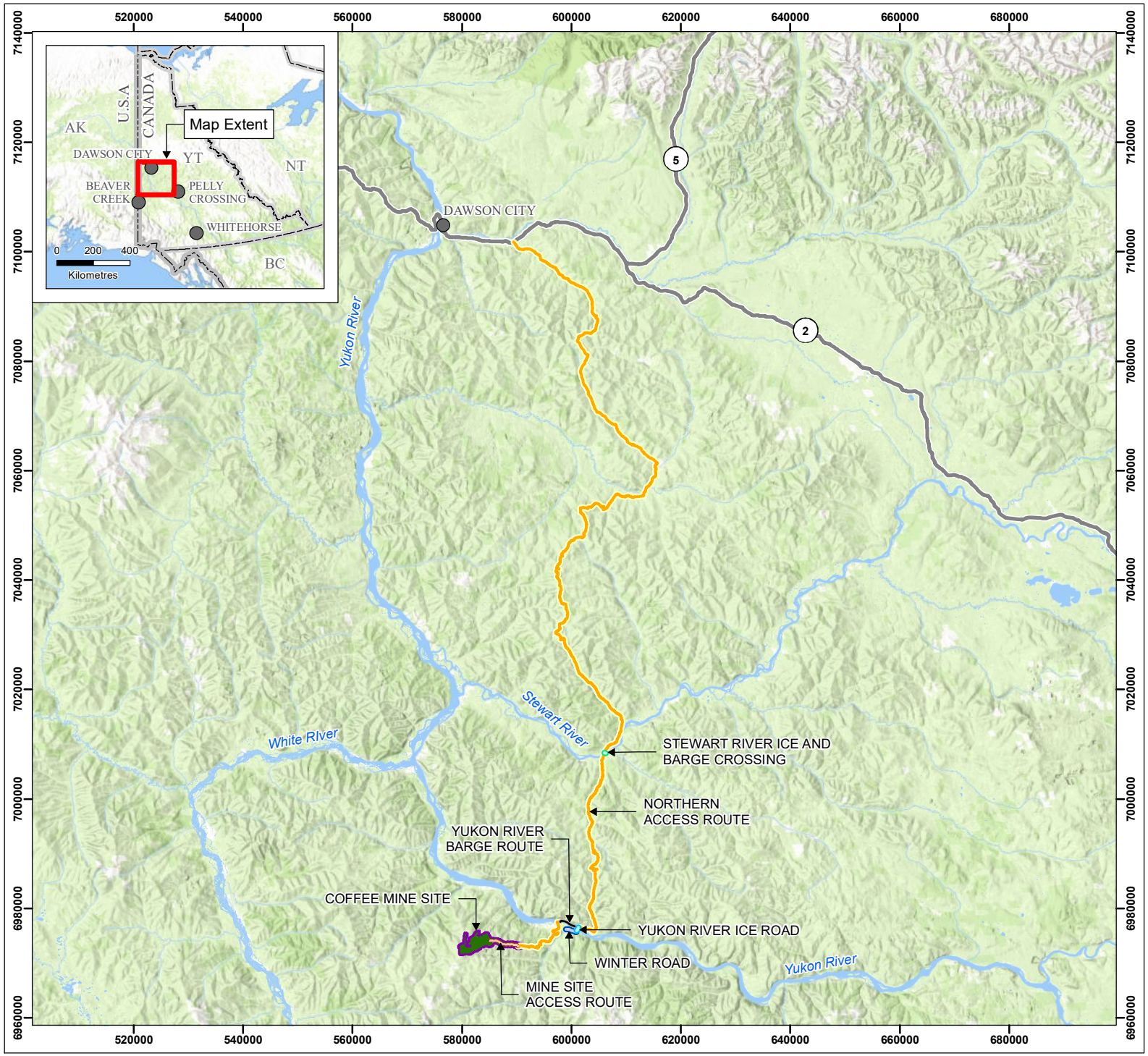
The proposed Coffee Gold Mine (the Project) is an open-pit gold mine owned by Goldcorp Kaminak Ltd., a wholly owned subsidiary of Newmont Corporation (Newmont), located on the south side of the Yukon River in the White Gold District of west-central Yukon. The Project site is approximately 130 km south of the City of Dawson, 140 km west of Pelly Crossing, 95 km north-east of Beaver Creek, and 340 km northwest of Whitehorse. The Project is located wholly within the traditional territory of Tr'ondëk Hwëch'in, partially within the traditional territory of Selkirk First Nation and First Nation of Na-cho Nyäk Dun, and partially within the asserted territory of White River First Nation. The Project contains several gold occurrences within an exploration concession covering an area of more than 600 km^2. The Mine Site will be accessed by road from Dawson via a 16-km stretch of Klondike Highway and 192-km all-season road, referred to as the Northern Access Route (NAR) (Figure 1-1). The NAR includes seasonal barge crossings on both the Stewart and Yukon rivers, with ice bridges and a seasonal winter road in the winter months.

The Project is comprised of four open pits: Supremo, Latte, Double Double, and Kona. Waste rock is proposed to be permanently stored in the Alpha Waste Rock Storage Facility (WRSF) (Figure 1-2). The ore production rate is proposed to be up to approximately 9.0 million tonnes (Mt) per year, producing an estimated total of 67 Mt of heap leach feed over the 10-year Operation Phase. The conceptual-level estimate for waste material to be moved over the life of mine (LOM) is up to approximately 330 Mt based on an average strip ratio of 5.0:1. The ore will be crushed and transported to the Heap Leach Facility (HLF) via overland conveyor or trucks for nine months of the year. During the three coldest months of winter, run-of-mine (ROM) ore will be stockpiled in the ROM stockpile. Gold will be extracted from gold-bearing leach solution by a six tonnes per day (t/d) adsorption, desorption, recovery carbon plant with mercury retorting to produce a final gold doré product. A total of 2.6 million ounces of gold is planned to be recovered over a 10-year mine life.

The Project phases are defined as follows:

- Construction Phase: Q2 Year –3 to end of Year –1 (30 months)
- Operation Phase: Year –1 to end of Year 9 (10 years)
- Reclamation and Closure Phase: Year 10 to end of Year 21, including a 6-year Post-Mining Closure Stage and a 5-year Active Closure Stage (11 years)
- Post-Closure Phase: Year 21 onwards as determined to be required.

These phases broadly describe the activities occurring within a particular time period; however, some activities will continue from one phase to another as mine site development advances with operational activities (e.g., Open Pits, WRSF). When areas that support mine operations are no longer required, they will be progressively reclaimed. The overall Project schedule is the general expected scenario for mine construction and operation; detailed activities are subject to change depending on detailed mine planning and the timing of receipt of authorizations.



COFFEE GOLD MINE

Coffee Project Location and Northern Access Route

Legend

- Stewart River Ice and Barge Crossing
- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route
- Project Area
- Project Footprint
- Highway
- Waterbody

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. Contains information licensed under the Open Government Licence - Yukon Territory
3. Basemap: ESRI World Topographic Map
4. Inset Basemap: ESRI World Topographic Map

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Kilometres

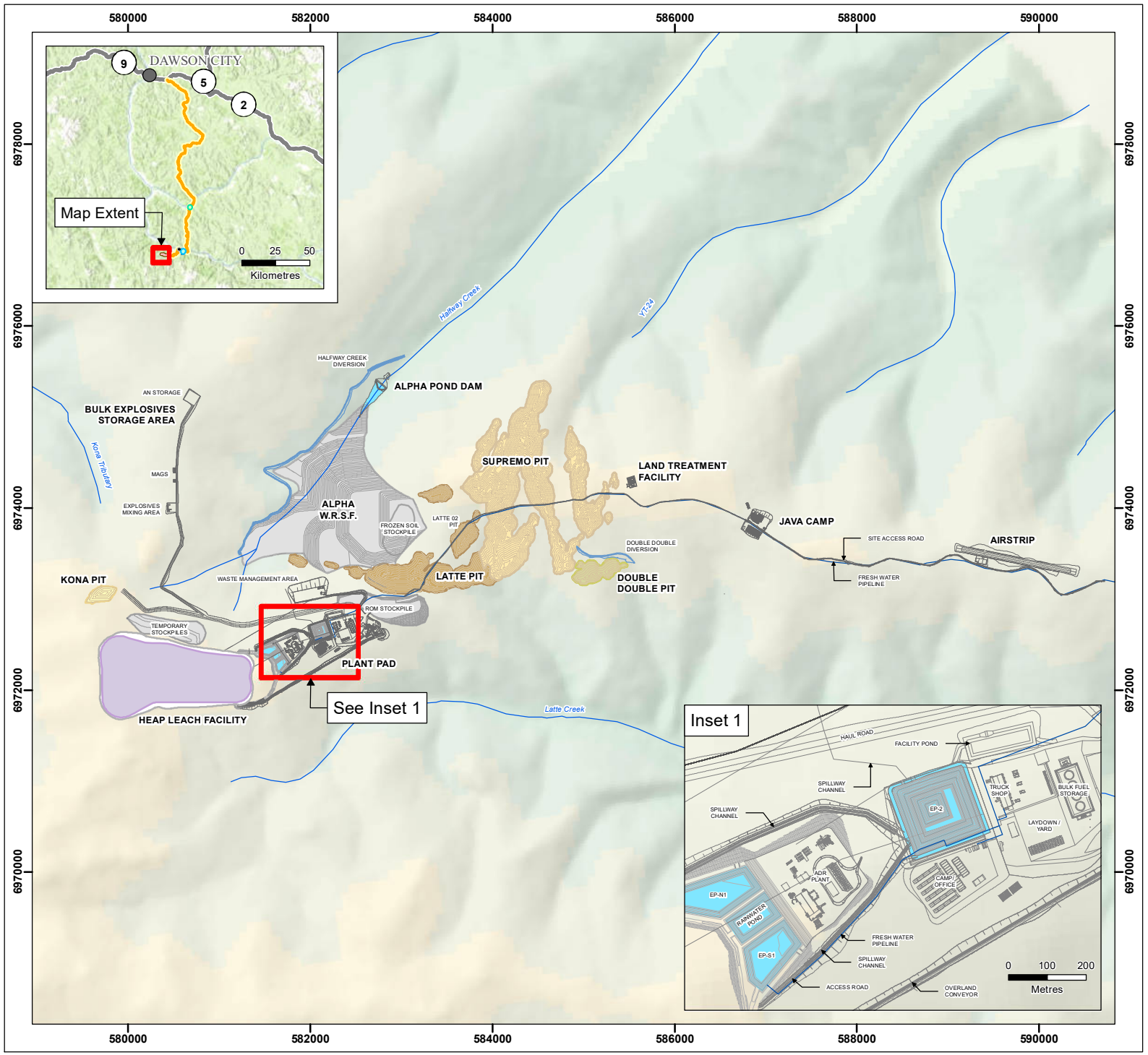
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Figure 1.1	Date: Mar 2, 2023	Drawn by: AS	Reviewed: KP

Newmont COFFEE

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COFFEE GOLD MINE

General Arrangement - Mine Site

Legend

- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
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3. Inset Basemap: ESRI World Topographic Map

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Figure 1.2	Date: Oct 6, 2023	Drawn by: AS	Reviewed: CH

Newmont COFFEE

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1.2 Scope and Objectives

Spills have the potential to occur at the Mine Site and along the NAR throughout all phases of the Project which may affect human health and the environment. This Spill Contingency Plan (the Plan) is intended to identify and demonstrate how appropriate management techniques will reduce the potential for any spill-related adverse effects to the environment and describes the measures that will be undertaken when a spill occurs as a result of Project activities. The Plan outlines preventative measures to be undertaken (i.e., employee training, regular inspection and maintenance, and Good Management Practices (GMPs) as well as spill response strategies for chemicals and hazardous substances to be used at the Project during construction, operation, and closure, including any periods of time should the Project enter into care and maintenance, with the exception of detailed cyanide response actions.

The detailed procedures to follow in the event of a cyanide-related spill are provided in the Heap Leach Facility Emergency Response Plan that is appended to the Site Wide Emergency Response Plan.

The purpose of the Plan is to minimize the impacts of spills through the establishment of pre-determined lines of response and plans of action, and to protect the safety of workers and contractors in the event of a spill. This purpose will be achieved by applying GMPs, by promoting environmental awareness and safety, encouraging prevention and maintenance, training staff and contractors in spill response procedures, and facilitating efficient clean-up of spills, releases, or discharges to land, water, ice, and snow. The Plan also facilitates effective communication with regulatory agencies, First Nations, communities, and the public. The Plan, as prepared, is adaptive and will be amended/updated as is practicable.

The objectives of the Spill Contingency Plan are to:

- Comply with federal and territorial laws, regulations, and guidelines
- Identify roles, responsibilities, and reporting procedures
- Detail plans of action to be followed in the event of a spill at the Project
- Provide readily accessible emergency information to cleanup crews and management
- Promote the safe and effective recovery of spilled materials
- Minimize the environmental impacts of spills to land, water, ice, and snow
- Outline communication procedure with regulatory agencies, First Nations, and public.

This Plan applies to all of the Project employees and its contractors associated with:

- The Project Mine Site
- The NAR upgraded or built by Newmont in support of the Project
- Two barge crossings of Stewart and Yukon Rivers.

During construction of the NAR, access to the sections of road south of the Yukon River and between the Stewart River and Yukon River will be limited to air and water transport. These operational conditions will require:

- Alternative storage locations for fuel, explosives, and compressed gas
- A separate inventory of spill response equipment

- Additional training for workers
- Modifications to spill response procedures
- GMPs specific for work on the NAR.

Use of the Spill Contingency Plan for operation of the NAR will include modifications to the procedures for initial reporting of a spill and to account for the additional measures to be implemented at the barge crossing locations.

This Plan has been written to meet the guidance provided in the Plan Requirement Guidance for Quartz Mining Projects (YWB and EMR 2013). Commitments that were made during the YESAB screening process related to the Spill Contingency Plan are incorporated into the plan where possible and are summarized in the Spill Contingency Plan Table of Concordance (Appendix C). The Table of Concordance includes commitments made during the assessment process only, as there were no Decision Document conditions related to spill contingency at the site.

This Plan is provided in conjunction with several other plans to meet the requirements for quartz mine applications for a Quartz Mining License and a Water Use Licence under the *Quartz Mining Act* and the *Waters Act*, respectively. Other applicable regulations related to spills are detailed in Section 2.

1.3 Incorporation of Consultation Feedback

Concerns around potential spills at the Mine Site and along the NAR have been raised during various stakeholder meetings. Some specific concerns heard during consultation events were:

- If there is a spill or runoff, it could affect wildlife that drink from the water, and could affect the entire ecosystem
- Accidents and spills could have potentially negative effects on the environment
- Stakeholders would like the opportunity to review the Spill Contingency Plan.

Concerns were heard from First Nations upon initial review of this plan regarding various plan components, including spill reporting to First Nations, as well as specific training requirements. The concerns highlighted the importance of the timely reporting of emergency spills, and that adequate training is critical to successful spill management. These concerns have been heard and are incorporated into the plan under the applicable sections.

First Nation engagement and consultation is ongoing, and any feedback that is received or concerns that are heard during consultation will be incorporated into this plan, where applicable.

1.4 Synergies with Newmont Internal Standards and Requirements

As an important part of Newmont's internal governance process, Newmont has implemented Global Policies and Standards (Global Standards) that are reviewed and preliminarily approved by a Global Policies & Standards Committee. The Global Standards provides the framework and standards for Newmont sustainability management and ensures a consistency of approach for implementing these global policies across the Company.

The Global Standards apply to all directors, officers and employees of Newmont Corporation, its subsidiaries, and any other entities that it controls. A variance request process for existing or future conditions is in place. The process provides an alternative mechanism for those instances where a Newmont site/operation cannot logistically or feasibly conform to a requirement established in a Standard due to special conditions or unique hardships. The Global Standards are intended to be fully integrated into all core business functions, and they emphasize sustainability, responsibility, and accountability at all organizational levels.

The list of Global Standards is provided in Table 1-1.

Table 1-1 Newmont Global Standards

Global Standards	
Air Emissions Management Standard	Land Acquisition and Involuntary Resettlement Standard
Biodiversity Management Standard	Local Procurement and Employment Standard
Closure and Reclamation Management Standard	People Policy
Code of Conduct	Product Stewardship Standard
Community Investment and Development Standard	Social Baseline and Impact Assessment Standard
Cultural Resource and Management Standard	Stakeholder Relationship Management Standard
Drug and Alcohol Policy (Coffee-Specific)	Tailings Storage Facility and Heap Leach Facility Environmental Standard
Hazardous Materials Management Standard	Tailings Storage Facilities Technical and Operations Standard
Health and Safety Policy	Waste Management Standard
Human Resources Standard	Waste Rock and Ore Stockpile Management Standard
Human Rights Standard	Water Management Standard
Indigenous Peoples Standard	

While this Plan can be reviewed in isolation to inform a review of the specific actions for spill management and monitoring, this plan should be viewed in concert with the following additional management plans in order to attain a holistic understanding of the Project:

- Cyanide Management Plan
- Site Wide Emergency Response Plan
- Heap Leach Facility Emergency Response Plan
- Explosives Management Plan
- Waste and Hazardous Materials Management Plan
- Water Management Plan.

1.5 Roles and Responsibilities of Key Personnel

Newmont has committed to providing the necessary human, material, and financial resources to implement and maintain the Spill Contingency Plan. The Environment Department will be responsible for

implementation of the monitoring components outlined in the Plan. Key Project personnel responsible for being familiar with the contents of this Plan are outlined in Table 1-2. Spill response procedures and reporting will be a part of general site orientation and training programs that are extended to all employees and visitors at the site.

Table 1-2 Roles and Responsibilities of Key Project Personnel

Role	Responsibility
Mine General Manager	Overall responsibility for Mine Site management.
Operations Manager	Responsible for mine planning and production, mine technical monitoring, and mine regulatory compliance.
Health and Safety (H&S) Manager	Responsible for conducting regular safety site inspections and implementing the appropriate controls in a timely manner. The H&S Manager shall maintain records of all safety inspections as well as any actions taken because of these inspections throughout the life of the Project. Where safety inspections show the potential for environmental effects, the H&S Manager will work in collaboration with the Environment Department.
Sustainability and External Relations (SER) Department	Responsible for recording and addressing any complaints received from nearby land users, or other interested parties regarding spill-related impacts off-site. The SER department shall maintain records of all complaints received as well as any actions taken because of these complaints.
Environmental Manager	Responsible for permitting, environmental monitoring and regulatory compliance.

2.0 REGULATORY AND GUIDANCE DOCUMENTS

2.1 Environment and Climate Change Canada

Environment and Climate Change Canada (ECCC) is the lead federal enforcement agency for any sort of spill or contamination into fish bearing waters or spills affecting migratory birds and their habitat. Their role is to:

- Oversee the clean-up of all hydrocarbon or other hazardous materials entering into a watercourse or fish bearing stream.
- Administer and enforce various federal laws such as the *Canadian Environmental Protection Act*, 1999, the Pollution Prevention Provisions of the *Fisheries Act* and the *Migratory Birds Convention Act* following a spill.

In this capacity, an Enforcement Officer collects evidence, draws samples, and may investigate any pollution incident to determine whether an offence has occurred. Enforcement Officers may recommend to the Public Prosecution Service that charges should be laid against the pollutant under one or both of these *Acts*. The Enforcement Officers may also recommend that charges be laid under applicable Territorial legislation.

2.2 Fisheries and Oceans Canada

Fisheries and Oceans Canada is the lead federal agency for fish and fish habitat. As such they would likely become involved in any major spill that has the potential to affect fish and/or fish habitat.

2.3 Transport Canada

Transport Canada is the lead federal agency for the transportation of dangerous goods. They would take the lead role in the following:

- Managing and enforcing the requirements of the *Transportation of Dangerous Goods Act* (TDG) following an emergency transportation incident.
- May assume Federal Lead Agency status for land-based spills involving rail cars or tank trucks.
- Transport Canada also staffs and manages the Canadian Transport Emergency Centre (CANUTEC), which provides 24-hour advice on chemical spill response, TDG requirements, and serves as a 24-hour emergency reporting center for hazardous materials incidents anywhere in Canada.

2.4 Yukon Department of Environment – Spill Report Center

In the event of an emergency pollution incident, such as an oil or chemical spill, federal and provincial/territorial authorities need to be notified in order to coordinate an adequate oversight of the response. Since emergency pollution incidents are often local in nature, and in order to reduce notification burden, ECCC's environmental notification system uses the following federal-provincial/territorial 24-hour authorities as the first point of contact. In turn, these authorities inform ECCC of the notifications. In the event of an environmental emergency or occurrence, please call the following 24-hour Yukon Territory telephone number:

867-667-7244

2.5 Guidance Documents

The following non-legislative documents also provide relevant guidance for spill contingency planning:

- Type A and B Quartz Mining Undertakings (YWB 2012) — This information package provides a framework for expectations of licence applications and describes the principles that will be applied during the deliberation process. This document also provides a list of additional guidance documents that can be referred to during the development of a quartz mining licence application.
- Preferred Practices for Works Affecting Yukon Waters (YG 2019) — This document provides Yukon-specific "preferred practices" that prescribe practical work-site guidelines to help developers protect water resources. The guidance document provides information regarding contaminant control, including information on spill kits and practices to help reduce the chance and consequence of spills.
- Plan Requirement for Quartz Mining Projects (YWB 2013) — this guidance document outlines expectations of environmental and operational plan content requirements.

3.0 SPILL DEFINITION AND CATEGORIES

3.1 Definitions

Section 132 of the Yukon's *Environment Act* defines a "spill" as release of a substance:

a. into the natural environment.
b. from or out of a structure, vehicle, or other container; and
c. that is abnormal in quantity or quality in light of all the circumstances of the release; or
d. in excess of an amount specified in the Yukon *Environment Act* (RSY 2002, c. 76) Spills Regulations (OIC 1996/193).

Where "**substance**" is defined as "a hazardous substance, pesticide, contaminant, or special waste".

An **emergency spill** is defined as a release of a hazardous product where there is potential for that product to enter a waterway or cause significant danger to life, health, or environment. Any spill that would necessitate a response by the Incident Commander and the Emergency Response Team (ERT) would be considered an emergency spill.

A **non-emergency spill** is defined as spill that does not meet criteria of an emergency spill and that the responsible party is competent to manage safely and efficiently in terms of assessment, prevention, containment, and clean-up.

3.2 Non-Reportable Spills

All spills, regardless of size, must be reported to the on-site Environment Department through internal reporting tools (e.g., Enablon risk management software or Spill Response Form (Appendix A)). The Environment Department will maintain a detailed log of all spills and will determine if reporting to the Yukon Spill Report Centre is required. As part of the Project's overall environmental management and in the spirit of a continuous improvement of environmental performance, procedures will be implemented to encourage

all employees to contain spills, undertake clean-up if it safe to do so, and report them to the Environment Department.

3.3 Reportable Spills

Spills require compulsory reporting for listed substances and thresholds as defined in Schedule A of Yukon Spills Regulations under the Yukon *Environment Act*; the substances and thresholds are summarized in Table 3-1. As a precaution, if there is any doubt as to whether the quantity spilled exceeds the minimum reportable threshold, the spill incident will be reported.

To ensure compliance with Section 36 (3) of the *Fisheries Act* and Section 132 of the *Environment Act*, all spills of hazardous materials, regardless of quantity, into a water body, or any spill that is abnormal in quality or quantity will be considered a major spill.

Table 3-1 Quantities of Spill Categories to be reported to the Yukon Spill Report Centre

Transportation of Dangerous Goods Class	Type of Substance / Category	Common Products On-site	Compulsory Reporting Amount
1	Explosives as defined in Section 3.9 of the Federal Regulations	Explosives used for blasting activities on site, such as ammonia nitrate	Any amount
2.1	Flammable gases as defined in Section 3.11(a) of the Federal Regulations	Acetylene, lubricants (aerosols), propane	Any amount of gas from a container larger than 100 L, or where the spill results from equipment failure, error or deliberate action or inaction
2.2	Non-flammable gases as defined in Section 3.11(d) of the Federal Regulations	Carbon dioxide in argon, liquid nitrogen, Loctite belt dressing, oxygen	Any amount of gas from a container larger than 100 L, or where the spill results from equipment failure, error or deliberate action or inaction
2.3	Poisonous gases as defined in Section 3.11(b) of the Federal Regulations	Ammonia (anhydrous)	Any amount
2.4	Corrosive gases as defined section 3.11(c) of the Federal Regulations		Any amount
3.1, 3.2, 3.3	Flammable liquids as defined in Section 3.12 of the Federal Regulations	Acetone, adhesives, paints, unleaded gasoline, fuel system cleaner, diesel fuel, fuel injector cleaner, AERO MX-5149 (modified thionocarbamate), Aerodri 100 dewatering agent, Flomin F 500 Frother (methyl isobutyl carbinol), heating oil treatment; Ethylene glycol; Motor oil; solvents; cement	200 L
4.1, 4.2, 4.3	Flammable solids as defined in Section 3.15 of the Federal Regulations	Flomin C 3505 Collector (potassium amyl xanthate), mercury amalgamation powder, sodium borohydride, Activated carbon; Sulphur prills	25 kg
5.1	Products or substances that are oxidizing substances as defined in Sections 3.17(a) and 3.18(a) of the Federal Regulations	Floran Catalyst (inorganic peroxide), potassium permanganate; Calcium peroxide; Hydrogen peroxide; Sodium nitrate	50 kg or 50 L

Transportation of Dangerous Goods Class	Type of Substance / Category	Common Products On-site	Compulsory Reporting Amount
5.2	Products or substances that are organic compounds that contain the bivalent "-0-0-" structure as defined in Sections 3.17(b) and 3.18(b) of the Federal Regulations		1 kg or 1 L
6.1	Products or substances that are poisons as defined in Sections 3.19(a) to (e) and 3.20(a) of the Federal Regulations	ALIQUAT 336 (methytriocytl-ammonium chloride), Frost Killer (methyl alcohol), hydrofluoric acid, methanol; Sodium cyanide	5 kg or 5 L
6.2	Organisms that are infectious or that are reasonably believed to be infectious, and the toxins of these organisms as defined in Sections 3.19(f) and 3.20(b) of the Federal Regulations	Biomedical waste	Any amount
7	Radioactive materials as defined by Section 3.24 of the Federal Regulations		Any discharge or a radiation level exceeding 10 mSv/h at the package surface and 200 mSv/h at 1 m from the package surface
8	Products or substances as defined by Section 3.24 - 5 kg or 5 L of the Federal Regulations	Aluminum/arsenic/cadmium/copper/ iron/lead/mercury/nickel/selenium/zinc standards, caustic soda (sodium hydroxide), Chloramine T (chloramine-T trihydrate), hydrochloric acid, magnesium nitrate, nitric acid, batteries; Lime;	5 kg or 5 L
9.1	Miscellaneous products or substances as defined by Sections 3.27(1) and 2(a) of the Federal Regulations	AERO 6493 Promoter (alkyl hydroxamate)	50 kg or 50 L
9.2	Miscellaneous products or substances as defined in Section 3.27(1) and 2(b) of the Federal Regulations		1 kg or 1 L

Transportation of Dangerous Goods Class	Type of Substance / Category	Common Products On-site	Compulsory Reporting Amount
9.3	Miscellaneous products or substances as defined in Section 3.27(1) and 2(c) of the Federal Regulations		5 kg or 5 L
	Special waste as defined in Section 1 of the Special Waste Regulations	Electronic waste; Fluorescent bulbs; Grease; Laboratory liquid waste, Oil filters; Waste oil and waste fuel	500 g (solid waste)[1] 500 ml (liquid waste)[1] 500 g or 500 ml, whichever is less (mixture of solid and liquid waste)[1] 5 kg (solid waste)[2] 5 L (liquid waste)[2] 5 kg or 5L, whichever is less (mixture of solid and liquid waste)[2]
	A pesticide as defined in Section 2 of the *Environment Act*, but not including those pesticides and fertilizers listed in Schedule 4 of the Pesticide Regulations		5 kg or 5 L
	Pesticides and fertilizers listed in Schedule 4 of the Pesticide Regulations		Any amount

[1]Within a 24-hour period
[2]Within a 30-day period

Note: adapted from Schedule A of Yukon Spills Regulations (OIC 1996/193) and presents the listed substances found in the regulations.
Federal Regulations: TDG Regulations (SOR/2001-286)
Sodium metabisulphite is not controlled under TDG Regulations (Canada)
Silicon dioxide (silica), disodium tetraborate (borax) and antiscalant are not listed as a marine pollutant under the TDG Regulations (Canada)
Copper sulphate is included as Class 9 (UN3077) as a substance not otherwise specified in the TDG Regulations (Canada)

Under the Yukon Spills Regulations, the release into the environment of a hazardous material above the reportable quantities or any release into a watercourse requires immediate notification of the 24-hour Yukon Spill Report Center[1] line (envprot@gov.yk.ca) at:

867-667-7244

Notifications will also include the mining inspector, First Nations[2], and applicable stakeholders. The Spill Response Form will be completed for all reportable spills (Appendix A) within 10 days of the spill. If necessary, written updates on the status of spill containment and clean-up will be sent to the Spill Centre, mining inspector, and First Nations.

3.4 Hazardous Materials

Hazardous materials to be used at the Project include:

- Petroleum products and lubricants – diesel fuel, motor oils, greases, anti-freeze, and solvents used for equipment operation and maintenance
- Adsorption, Desorption, Recovery plant and heap leach pile consumables – chemicals for gold extraction and recovery, including sodium cyanide
- Water treatment consumables – chemicals
- Explosives – ammonium nitrate fuel oil, emulsion, other explosives, and caps used for blasting
- Laboratory consumables and wastes – various chemicals used in the assay laboratory
- Liquified natural gas
- Other – batteries, glycols, paints, compressed (inert and flammable) gases, industrial cleaning supplies, etc.

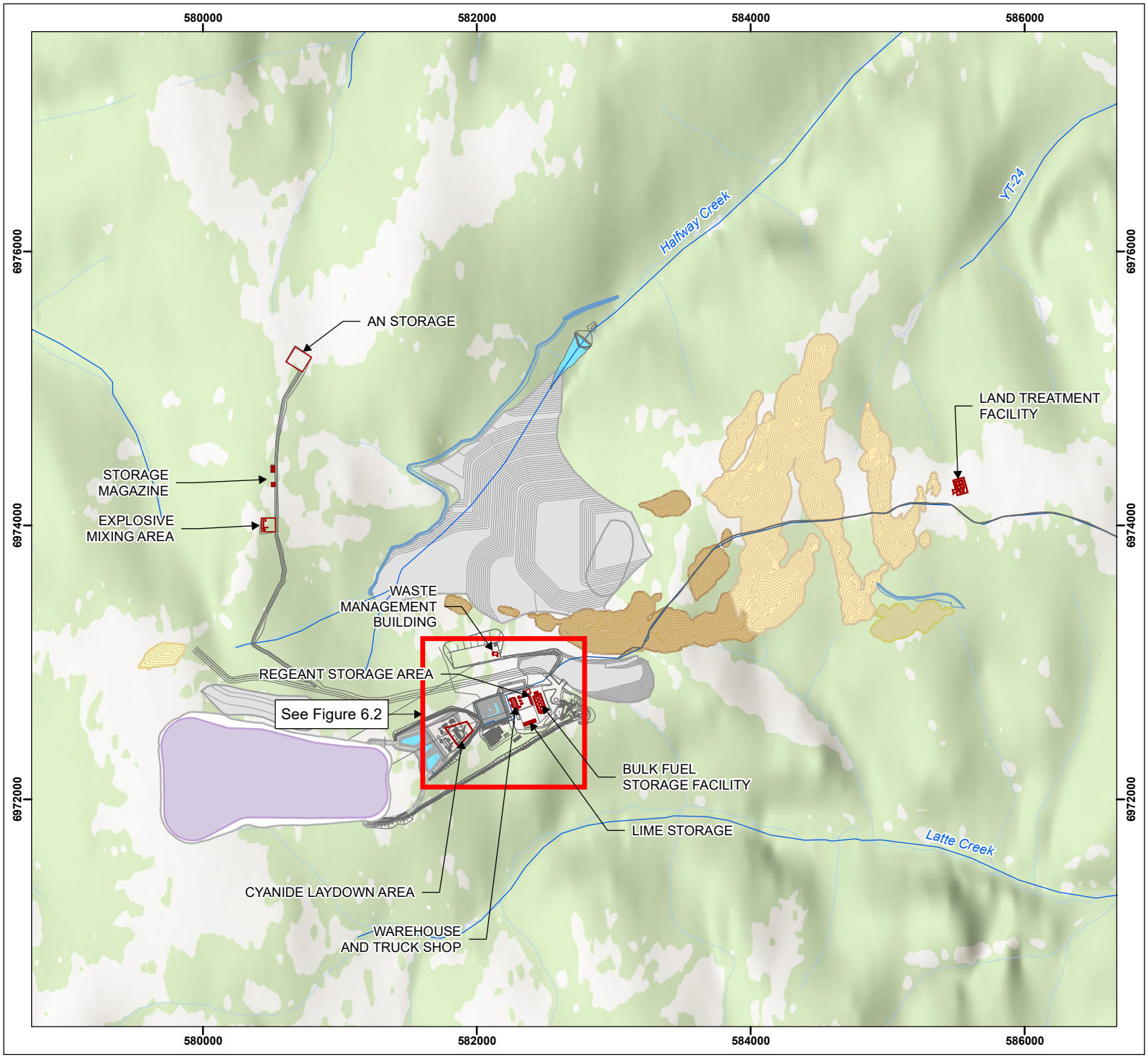
Locations of hazardous materials stored on-site is shown on Figure 3-1 and Figure 3-2.

Hazardous material used on-site, storage procedures and locations, as well as handling are described in the Waste and Hazardous Materials Management Plan. The transport, storage, handling of cyanide is detailed in the Cyanide Management Plan, and cyanide spill response procedures are detailed in the Heap Leach Facility Emergency Response Plan. The Material Safety Data Sheets (MSDS) for all materials transported, stored, and used on-site are provided in Appendix B and as a part of the Waste and Hazardous Materials Management Plan. They will be available at locations where hazardous materials are stored or used, in the First Aid Room, and the Environment Office. Employees and contractors are always to consult the respective MSDS for authoritative procedures when responding to a spill of a hazardous material.

As discussed in Section 4.2, appropriately sized and compatible spill kits will be available at locations where hazardous materials are stored and used.

[1] The Spills Regulations state in section 4, “For the purposes of section 133 of the *Act*, a report to the Yukon Spills Report Centre will be considered a report to an environmental protection officer”.

[2] The First Nations include Tr’ondëk Hwëch’in First Nation, Selkirk First Nation, First Nation of Na-cho Nyak Dun, and White River First Nation.



COFFEE GOLD MINE

Hazardous Materials Locations

Legend

- Hazardous Materials Location
- Stockpile
- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit
- Watercourse

Notes

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2. Contains information licensed under the Open Government Licence - Yukon Territory
3. Basemap: ESRI World Topographic Map

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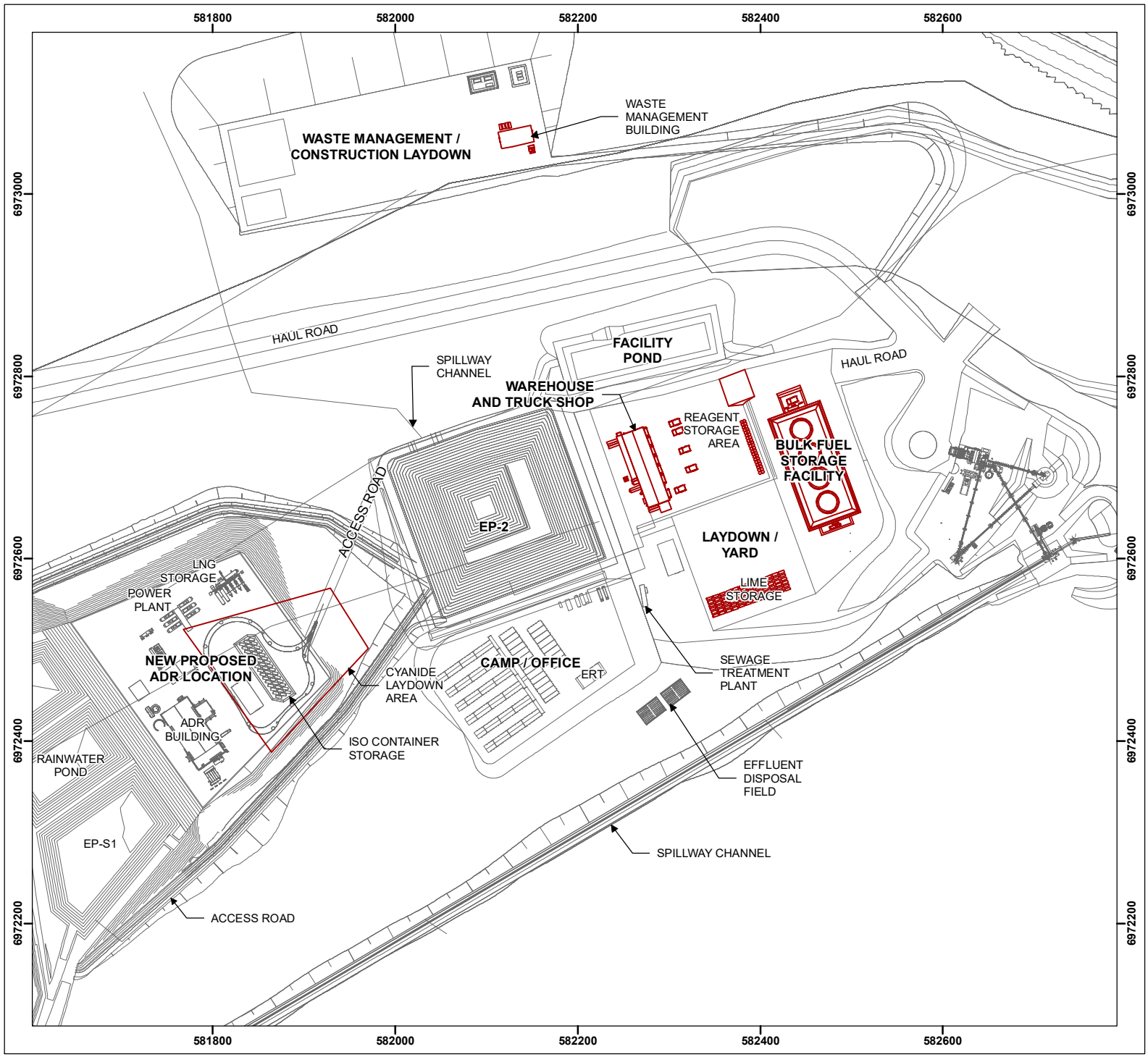
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Page Size: 8 ½" x 11"

Figure 3-1	Date: Nov 3, 2023	Drawn by: AS	Reviewed: KP

Newmont COFFEE

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COFFEE GOLD MINE

Hazardous Materials Locations – Plant Site

Legend

- Hazardous Materials Location
- Site Feature

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

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Metres

NAD 1983 UTM Zone 7N

Page Size: 8 ½" x 11"

Figure 3-2	Date: Aug 22, 2023	Drawn by: AS	Reviewed: KP

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4.0 GOOD MANAGEMENT PRACTICES

Good Management Practices (GMPs) are approaches that through experience and research have proven to reliably allow one to achieve the desired objectives. They provide awareness and guidance to all personnel, help ensure compliance with various legislations, regulations, and policies, and generally act to mitigate environmental impacts. GMPs for the prevention of spills are outlined below.

4.1 Health and Safety

The following health and safety measures be implemented at the Project:

- Emergency contact numbers will be kept up to date and easily accessible
- Spill response training emphasizing health and safety will be conducted regularly and a copy of the Spill Contingency Plan will be readily accessible at all times in all offices
- All site personnel will be familiar with PPE requirements and use
- Personnel, where applicable, will be trained in safe practices working around aircraft and heavy equipment
- MSDSs for all hazardous materials will be located in the Environment and Health Care offices, while MSDSs specific to mining, processing, and site services will be located in the mining office, process plant, and site services shop, respectively. MSDSs will also be available where products are used and stored
- Fire extinguishers, kept in working order, will be kept near fuel storage areas
- Signage clearly indicated “No Smoking” will be posted near fuel transfer areas, and operators will always be in attendance during fuel and oil transfers.

4.2 Spill Supplies and Equipment

Spill response kits will be available at all hazardous material storage sites and fuel transfer areas as outlined in Table 4-1 and shown on Figure 4-1 and Figure 4-2. Spill kits will also be available in hazardous material transporters, with construction crews, heavy equipment service vehicles, and light trucks to allow immediate response to small spills that may be caused by or occur near them.

The contents of a spill kit will be compatible with the volume and type of hazardous material being used or stored near its location. The spill kits are intended for initial spill response, and spill response procedures for materials of higher quantities will be implemented by the Emergency Response Team (ERT) who will have access to adequate equipment. The kits will be kept in marked and accessible locations. They will generally contain booms, sorbent material, shovels, and Personal Protective Equipment (PPE), and will be used in accordance with the Spill Contingency Plan. Fire extinguishers will be stored near spill kits in case of flammable materials. Spill kits will also contain a kit inventory list to assist with monthly inspections and replenishment of spent supplies and equipment.

Each department and work area will be responsible for providing sufficient spill response kits in their respective work areas. The Environmental Department will undertake routine spill kit inspections to ensure the kits are fully stocked. In the event that a spill kit is used for spill response, the kit will be replenished after the spill response is completed. Table 4-1 provides an inventory of anticipated spill response equipment, which will be strategically located around the site.

The Environment Department will ensure that:

- Spill response equipment is available and readily accessible, and matches the inventory list in the spill kit
- Signage for spill notification is available
- Each location has appropriate spill response equipment
- Storage drums and tanks are well labeled
- The Spill Contingency Plan is in place, up to date, and tested. A copy of the Spill Contingency Plan will be kept at centers of operation (i.e., Environment, Safety, Operations, Mining Offices, and the Camp) at all times.

A storage facility with spill supplies and equipment will be located at the Yukon and Stewart River crossings.

Table 4-1 Example Inventory of Spill Response Equipment for the Project

Location	Type of Equipment

Pit Area (close proximity to each loading area)	• 1 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Safety Glasses
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Fire extinguisher

Crusher Aea	• 1 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Safety Glasses
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Heap Leach Facilities	• 2 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• Hydrogen peroxide for cyanide spills
	• This location will also be equipped with the following:
	  ○ Fire extinguisher
	  ○ Self-contained breathing apparatus (SCBA)
	  ○ Totally-Encapsulating Chemical Protective (TECP) suits
	  ○ Escape air packs (10 minute)

Location	Type of Equipment

Process Plant	• 2 X 100 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• Mercury Spill kits containing:
	  ○ PPE
	  ○ Waste mercury bottle
	  ○ Manipulation items (i.e., scoop, brush)
	  ○ Absorption systems (i.e., sulphur powder)
	• Hydrogen peroxide for cyanide spills
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher
	  ○ Self-contained breathing apparatus
	  ○ Totally-Encapsulating Chemical Protective (TECP) suits
	  ○ Escape air packs (10 minute)

Explosives Storage and Preparation Facility	• 1X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Truck Shop and Warehouse	• 2 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Location	Type of Equipment

Fuel Storage Farm	• 3 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Power Plant	• 1 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Contingency Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

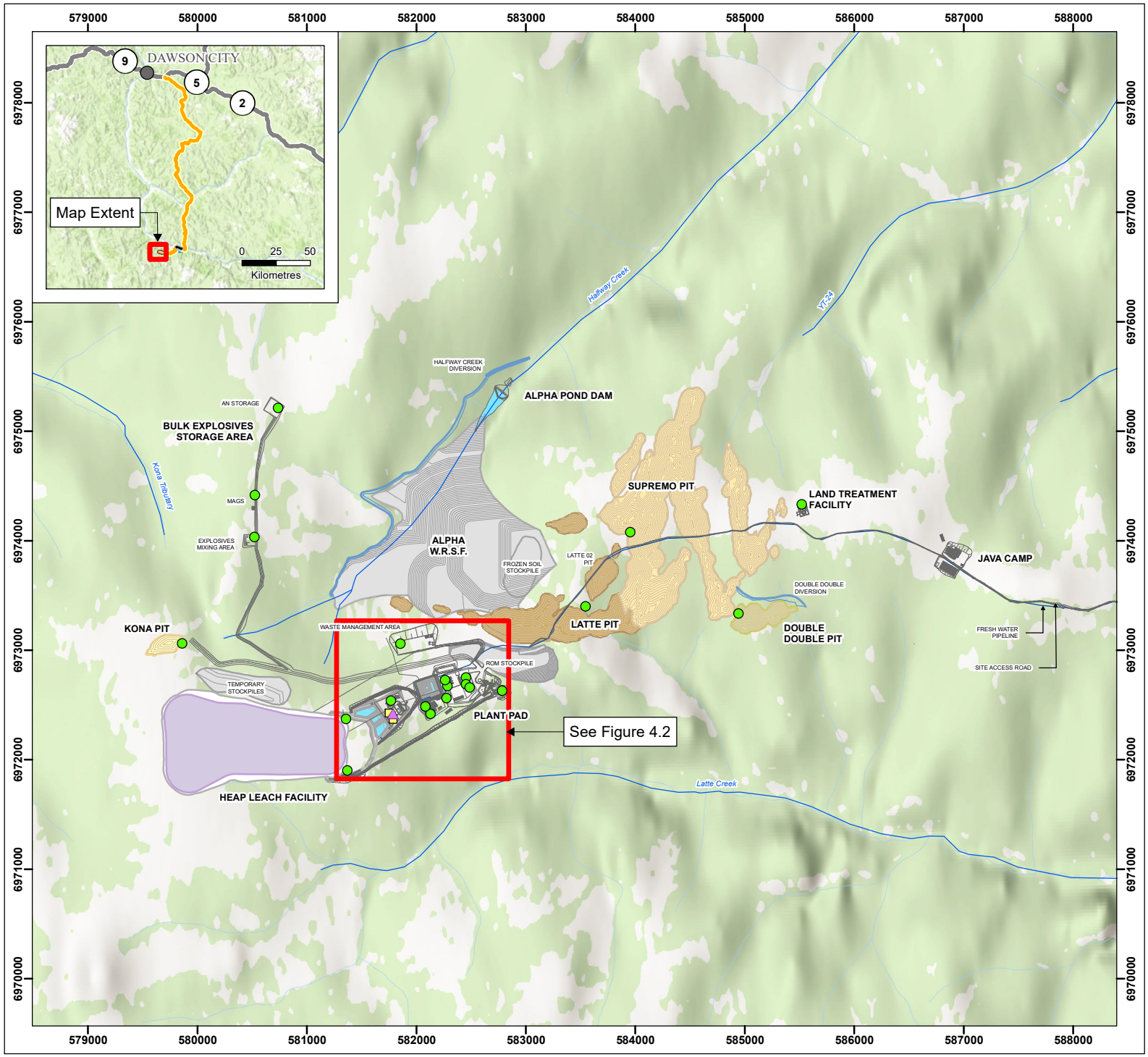
Waste Management:
Landfill
Land treatment facility
Sewage treatment plant
	• 1 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Response Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Location	Type of Equipment

Camp	• 2 X 50 Gallon Spill kits containing:
	  ○ Booms, Sorbent Pads, Socks, Pillows
	  ○ Disposal Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Goggles
	  ○ Shovels
	  ○ Spill Response Plan
	  ○ Emergency Response Plan
	• This location will also be equipped with the following:
	  ○ Respirators
	  ○ Fire extinguisher

Mine Vehicles:
Heavy Service Vehicles
Fuel transfer vehicles
Explosive transport vehicles
Pick-up trucks
	• Vehicle spill kits containing:
	  ○ Sorbent Pads, Socks and Pillows
	  ○ Disposable Bags and Ties
	  ○ Granular Absorbent
	  ○ Neoprene Drain Cover
	  ○ Chemical-resistant Gloves
	  ○ Safety Glasses Shovels
	  ○ Spill Response Plan
	• Mine vehicles will also be equipped with:
	  ○ Fire extinguisher

Mobile Environmental Emergency Trailer	• Elastic Pump or equivalent • Pump accessories • Vacuum ends • Tubing or pipes for vacuum or pumping • 45 gallon drums tops • Diesel fuel jerry can • Spill response accessories • Drum opener • Empty drums • Spill Response Plan • Absorbent oil spill pads • Universal booms • Tarps • Granular Absorbents (e.g., sphagsorb) • Ice breaker chisel • Clay compound for plugging leaks • Hand shovel • Sledgehammer • Fire extinguisher
Temporary Containment Systems (Environment Department office)	• Booms, drums, tanks, spill absorbent material packages / pads, silt fencing.



COFFEE GOLD MINE

Locations of Spill Kits

Legend

- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit

Spill Kit

- 50 Gallon
- 100 Gallon
- Mercury

Notes

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2. Contains information licensed under the Open Government Licence - Yukon Territory
3. Basemap: ESRI World Topographic Map
4. Inset Basemap: ESRI World Topographic Map

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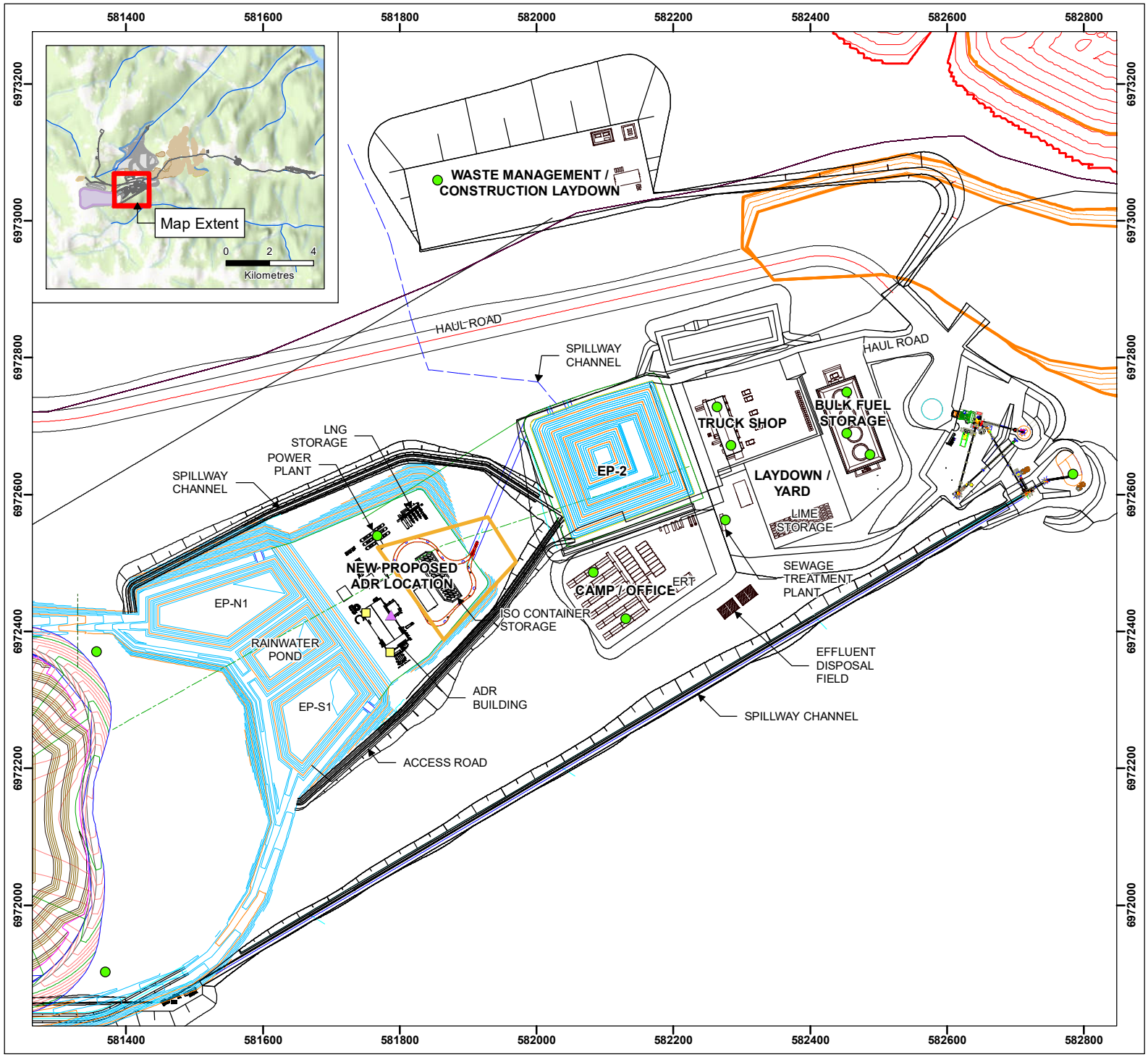
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Figure 4.1	Date: Nov 3, 2023	Drawn by: AS	Reviewed: KP

Newmont COFFEE

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COFFEE GOLD MINE

Locations of Spill Kits – Plant Site

Legend

Spill Kit

- 50 Gallon
- 100 Gallon
- Mercury

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. Inset Basemap: ESRI World Topographic Map

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Figure 4.2	Date: Nov 17, 2023	Drawn by: AS	Reviewed: KP

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4.2.1 Spill Response Equipment for the Northern Access Road

It is anticipated that the NAR construction will require dozers, excavators, scrapers, rock trucks, gravel trucks, front end loaders, graders, compactors, water trucks, tractor trailers, crane trucks, drilling and blasting equipment, barges, aluminum boats, and 4x4 pickup trucks. Sufficient spill kits and equipment, including fire extinguishers, will be maintained with each construction crew as well as with all service vehicles to be able to provide response to localized spills, and initial response to larger spills. The spill kits are contained within sealed 50-gallon drums and will include:

- Booms, Sorbent Pads, Socks and Pillows
- Disposable Bags and Ties
- Granular Absorbent
- Shovel
- Neoprene drain cover
- Chemical resistant gloves
- Googles & Safety glasses
- Empty 45 Gallon Drums
- Spill Contingency Plan.

Barge crews at the barge crossing locations on the Stewart and Yukon River will be trained to respond to spills at the crossing sites, and emergency equipment will be kept at all barge crossings. Spill response equipment that will be kept at the barge crossings will include:

- 50 gallon spill response kit (contents specified above)
- Fire extinguisher
- Aluminum boat
- Barge
- Satellite Phone.

The spill kits located with the construction crews and within the service vehicles are intended to provide initial response to a spill, and/or provide response to a small, localized spill that occurs along the NAR. Larger spills that potentially occur along the NAR will receive initial response using the spill kits, then larger scale response, if required, using additional equipment that will be mobilized out of the barge landing areas. Spills that exceed the capacity of the barge landing spill response supplies would likely constitute an emergency spill, which would initiate response from the H&S Department, Environmental Lead and the Emergency Response Team who will be equipped to respond to large magnitude spills.

In the case of a cyanide spill emergency, procedures will be carried out as outlined in the Heap Leach Facility Emergency Response Plan. Employees will be oriented and trained in cyanide transportation and storage, as well as in cyanide spill handling procedures, and will have access to communication devices for immediate response in the case of a spill.

4.3 Spill Communication

Effective communication systems and timely response are critical to the success of spill responses. The main on-site radio communication system will be used to alert workers to danger, convey safety information, and maintain site control. All of Newmont's company vehicles and contractor vehicles will be required to carry a phone list with emergency numbers and a mobile satellite phone or radio when work teams are working away from the main communication systems such as along the access road or at the tug-barge river crossings. In addition, all Newmont contractors will be required to become familiar with and receive adequate training in the spill communication process. In the event of a spill, the road user will use the phone to contact the appropriate personnel (their supervisor, ERT, Safety and Security, and/or the Environment Department). Communication equipment maintained on-site will include radios, telephones, satellite phones, and other wireless communication systems; all will be used at the mine and will be available in the event of emergency incidents such spills, accidents, or malfunctions.

4.4 Storage of Hazardous Materials

The fuel tank farm bund (a type of constructed retaining wall) will be lined with high-density polyethylene (HDPE) for spill containment. Details on fuel and hazardous materials storage at the Mine Site are provided in the Waste and Hazardous Materials Management Plan. Details are as follows:

- Fuel required for mine operations will be stored in four four-million-litre field-erected diesel tanks and up to 500,000 L liquefied natural gas (LNG) bullet tanks.
- All on site diesel storage tanks that are less than 100,000 L will be double walled with 100% containment. Tanks will be stored in bermed HDPE lined facilities to contain minor spills during fuel transfer.
- The tank farm will have berms and an impervious high-density polyethylene (HDPE) liner, and a spill containment capacity equal to the volume of the largest tank plus 10% of the volume of the remaining tanks, or 110% the volume of the largest tank, whichever is greater. Tanks will be single-walled and constructed of welded steel. The tanks and storage locations will be designed and constructed to meet the Canadian Council of Ministers of the Environment (CCME) guidelines for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2008) and the Yukon Storage Tank Regulations (OIC 1996/194).
- Hydrocarbon products will be stored and/or transferred a minimum of 30 metres from any water course, unless necessary, (e.g., fueling barges).
- Storage containers will be kept in good condition, sealed with proper fitting lids, caps, or valves.
- All storage containers will be labelled in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
- Inspections of hazardous materials (fuel, chemical, waste) storage areas will be conducted (including connectors, hoses, and nozzles).
- "Overpack" or "salvage" drums will be kept nearby to contain leaking drums.
- Storage areas will be kept secure from unauthorized access.
- Incompatible materials will be segregated.
- Chemical storage areas will be adequately protected from weather and physical damage.
- Adequate spill response materials will be provided at all storage areas (spill response supplies and equipment are outlined in Section 4.2).

4.4.1 Storage Locations for the Northern Access Road

The road contractors will be responsible for sourcing their accommodations and the necessary infrastructure to support road construction activities. Once the road contractors have been awarded the work, they will be responsible for establishing their fuel and explosive storage facilities. Fuel storage tanks will be placed in a secondary containment area with an impermeable liner and bermed to contain 110% of the tank volume. All explosive storage facilities will be permitted and comply with the *Explosives Act*. Details on the fuel storage area during construction of the NAR are available in the ARCMP.

Compressed gas may be used by mechanics to maintain and repair road construction equipment on the NAR. Compressed gas will only be stored on shop trucks and will be done so in a manner that complies with applicable regulations.

4.5 Fuel Transfer Procedures

As discussed in Section 8, training will be provided to all individuals in the handling, transportation, and storage of fuels and lubricants. All Newmont contractors responsible for the transportation of materials to and from the site will be required to adhere to safe driving procedures including posted speed limits. The GMPs provided below will be followed for additional spill prevention and protection.

4.5.1 Transferring to Tank Farm

The transfer of diesel fuel from tanker trucks arriving at the Mine Site to the tank farm will be executed by an approved contractor or trained staff. Standard Operating Procedures will be developed and followed to meet safety and environmental goals. Spill response equipment and supplies, including spill kits, will be carried by the tanker trucks, and located at the tank farm near the transfer point.

The engineering measures for spill prevention will include:

- Transfer of fuel from the tanker truck to the tank farm will either:
    - take place on a pad with berms[3] that will be lined with an impervious HDPE liner to contain any spilled fuel within the bermed area; or
    - take place within a fueling area that will drain toward the fuel tank bund. Any hoses will be inside the containment.
- The area where the tanker truck will be off-loaded will have adequate lighting.
- An automatic monitoring system for the tank farm will be installed for continuous quantity tracking. The fuel inventory will be reconciled with the fuel used, and discrepancies will be investigated.
- The overfill prevention system will sound an alarm in the control centre in the event a tank is being overfilled, or if the expansion of the fuel results in an unacceptable high level of fuel in the tanks.
- To allow for expansion and to prevent a spill, the tanks will not be filled above 90% capacity.
- Transfer operations will be suspended should a leak be detected.
- Personnel will attend all fuel transfers and will be able to manually shut off the flow of fuel.
- All flexible hoses and connections will be inspected and supported before use.

3 The berms will not be of a significant height, which will allow a tanker truck to drive over them and station itself on the pad. The volume of the bermed pad will exceed the volume of the largest tanker truck by 10 percent.

4.5.2 Dispensing to Mobile Equipment

Fuel-dispensing equipment for mining, plant services, and freight vehicles will be located adjacent to the fuel tank bund, and the fuelling area will drain into the bund. Additional fueling of mobile equipment will be conducted in areas throughout the mine, including the Alpha WRSF, within open pits, and along haul roads. The following preventative measures will be implemented to minimize the chance of spills associated with fuel dispensing:

- Fueling will be conducted 30 m away from any water course and with the equipment operator having direct visual contact with the equipment at all times during re-fueling.
- The operator is to remain with their mobile equipment during refuelling at all times and be vigilant in not overfilling the fuel tank and spilling fuel.
- The fuel truck operator will check the hoses and pumps on a daily basis and will carry spill response supplies to quickly respond to any non-emergency spills (Section 4.2).

4.5.3 Barge Fueling

A sorbent pad will be placed at the base of the fuel tank mouth by the NAR construction crew to help catch any dripped fuel, and the tank will be fueled with a minimum crew size of two people. One person will run the nozzle and the other will stand near the tank/pump ready to switch the emergency stop button if a failure occurs.

4.6 Cyanide Management

All procedures for cyanide handling, transportation and storage will be executed in compliance with the Cyanide Code and will follow Safe Operating Procedures (SOPs) that are specifically developed for the safe handling of cyanide. Sodium cyanide will be transported to site as dry briquettes either in 20 tonne airtight ISO containers complete with trailer or in one tonne bags/boxes that are lined and sealed. The boxes will be transported in containers that will provide additional protection of the product during transport and storage. The trucks delivering and returning with ISO containers and/or boxes will be placarded as specified in the *Transportation of Dangerous Goods Act*, and associated Regulations.

The ISO containers carrying the NaCN briquettes will be delivered and stored on tandem axle trailers in a designated cyanide laydown area near the process plant. The ISO containers will be attached to their own dedicated trailer, and they will not be removed from the trailers. In the case of one tonne NaCN boxes, the boxes will be removed from the container and stored in a dedicated cyanide box storage warehouse. The NaCN will remain stored in the ISO containers and/or warehouse within the cyanide laydown area until required for use in the Process Plant. Additional details regarding the handling and storage of cyanide is provided in the Cyanide Management Plan.

Cyanide solution transfer and make-up processes could potentially be a source of spill and contamination, and procedures to follow in the event of a spill during the cyanide make-up and transfer process, including cyanide briquette and dilute cyanide spills, are provided in the Heap Leach Facility Emergency Response Plan.

5.0 SPILL RESPONSE ACTION PLAN

Implementation of the spill action plan requires knowledge of spill identification, spill response kits and locations, spill response procedures, and clean-up protocols. In addition to the internal and external reporting requirements, spills must further be categorized as “emergency” or “non-emergency” incidents as the action plans and reporting requirements will differ according to the type of spill. All Newmont contractors will be required to become familiar with and receive adequate training in the reportable spill communication process. Non-emergency and emergency spills are further defined in Section 5.1 and Section 5.2.

The procedure for spills which have ignited is documented in the Emergency Response Plan Section 6.2.

5.1 Spill Response Procedures: Non-Emergency

The majority of spills that are likely to occur on the Project Site will include a simple stepwise process initiated by the discoverer. If the safety at the scene is in doubt, then it is imperative that the Site H&S department is notified immediately. A “non-emergency” spill is defined as a spill of any product that the discoverer, or other personnel within close proximity, of the incident can competently, safely, and efficiently manage in terms of assessment, prevention, containment and clean-up. A non-emergency spill does not have the potential to enter a waterway or cause significant danger to life, health, or the environment. This typically includes fuels, oils, lubricants, and coolants. For example, spilling 1 L of fuel while refueling equipment would be classified as a non-emergency spill, as it: does not have the potential to enter a waterway; cause significant danger to life, health, or the environment; and can be cleaned up by site personnel.

When a non-emergency spill occurs, the discoverer should first assess the scene for safety, and then should proceed to the following steps:

- Stop the spill:
  - Stop or reduce discharge and flow by plugging, up-righting, adjusting valves, etc. Shut down equipment if required
  - Check the Safety Data Sheet for information about the spilled material.
- Contain the spill:
  - Place down absorbent pads, spill trays, or buckets to absorb the spill
  - Build a dike or berm with earth, snow, ice or other materials
  - Build a trench or a lined sump down.
- Report the spill to your supervisor:
  - Supervisor must notify Environmental Department as soon as possible and complete the Spill Response Form (Appendix A). The form will be submitted to the Environment Department for logging.
- Flag off the area
- Remove the spill:
  - Shovel or dig up the contaminated material and place into a bag, bucket or drum
  - Containers must be in good condition and not allow material to escape
  - Small amounts of contaminated material that are easy to move can be given to the Environmental Department or dropped off at the contaminated soil berm by the landfill

- Material shall be kept in the container; do not dump it out.

For larger spills, or if assistance is required to deal with the incident, the Environmental Department is to be notified by radio immediately. A complete inventory of dangerous goods stored and used at the Project, including details on material handling, PPE requirements, and disposal methods, is provided in the Waste and Hazardous Materials Management Plan.

5.2 Spill Response Procedures: Emergency

An “emergency” spill is a release of a hazardous product where there is potential for that product to enter a waterway or cause significant danger to life, health or environment. For example, an emergency spill could include a barge running aground and releasing fuel into the Yukon River. When a spill is discovered, the first step is to assess the scene for safety. The discoverer must initiate emergency procedures by calling “Code 1, Code 1, Code 1” on the Mine Site’s open channel and channel 1 (Emergency Channel), and by activating an air horn three times.

This protocol will initiate a response of the H&S Department, Environmental Lead and the Emergency Response Team. The Emergency Spill Response Command Structure is detailed in Figure 5-1. If it is safe to do so, immediately control and contain the spill by any means necessary with the help of any other personnel within close proximity of the incident. The relevant Safety Data Sheet should also be checked for more information about the spilled material.

In addition to the health care providers on-site and if required, the City of Dawson Municipal Hospital or Whitehorse Regional Hospital health professionals will be called for assistance. Further details on emergency response procedures are provided in the Site Wide Emergency Response Plan.

The immediate priority in the case of an emergency spill is to ensure safety of any personnel in the vicinity and to minimize the potential impact to the environment due to the release of hazardous material. To this extent, there are three priority actions to be undertaken, by the discoverer(s), when responding to spill emergencies:

Respond Quickly

- Ensure the safety of yourself and others
- Immediately warn all personnel working near the spill area
- In case of an emergency spill, initiate "Code 1, Code 1, Code 1" on Mine Site’s open channel and channel 1 (Emergency Channel)
- Provide details to and receive advice from Emergency First Responder
- Attend to the injured and call for assistance if necessary
- Prevent injury by keeping people away from the spill site
- Identify the spilled material (if unknown assume it is hazardous)
- Approach spill from upwind ONLY IF IT IS SAFE TO DO SO
- Assess the severity of the spill
- Stop the flow (e.g., shut-off valve, pumps, etc.) ONLY IF IT IS SAFE TO DO SO
- Shut off ignition sources, such as vehicles, unplug electrical equipment and implement a no smoking area within 30 m of the spill

- Report spill to Supervisor in the case of a spill to soil, water, snow or ice
- Supervisor will contact the Incident Commander as soon as possible with basic information of spill – What, Who, Where, When, and How
- Incident Commander will engage and mobilize the ERT if necessary.

Respond Safely

- Use PPE, such as impervious clothing, goggles, and gloves, when containing the spill
- Consult the MSDS and Product Guides for information on safe handling, containment, and cleanup of the spilled substance
- Do not contain compounds if vapours might ignite (e.g., diesel, aviation fuel, liquefied natural gas) – allow them to evaporate
- Depending on the type of compound spilled and IF IT IS SAFE TO DO SO, contain product using booms, berms, absorbent pads, earthen dike, trenches or improvise with materials at hand
- Under the direction of ERT, being clean-up activities.

Report Spill

- For reportable spills, the Environmental Manager will report the spill to the Yukon Spill Centre as soon as it is feasible, and to other jurisdictional/Mine stakeholders and First Nations partners within 24-hrs
- The Environment Department will complete the Spill Response Form found in Appendix A and submit it to the Spill Centre, mine inspector and First Nations within 10 days of the occurrence of the spill. First Nations will be notified as soon as possible once the initial assessment of the spill is complete, and the reportable spill is confirmed. If applicable, local authorities of downstream communities will also be notified by the SER Manager.

5.2.1 Spill Response Procedures for NAR Construction

The procedures for managing spills during the construction of the NAR will follow the steps outlined above with only minor modifications required to better accommodate the challenges associated with road construction activities. These modifications include:

Communication requirements:

- The Mine Site's radio coverage will not include sections of the NAR. Road crews will be required to report a spill using a satellite phone or camp phone. Due to the remote nature of the work, at least one satellite phone will be required at each road heading.

Disposal of spilled material:

- If an incident occurs where large volumes of soil are contaminated with hydrocarbons, the material will be hauled to an off-site treatment facility, or a third party will be contracted to complete remediation works.

The procedures for the Environmental Manager to determine if a spill clean-up is complete:

- Road construction activities will occur before the lab at the Mine Site is constructed. For that reason, a third party will be contracted for the analysis of samples from a contaminated site.

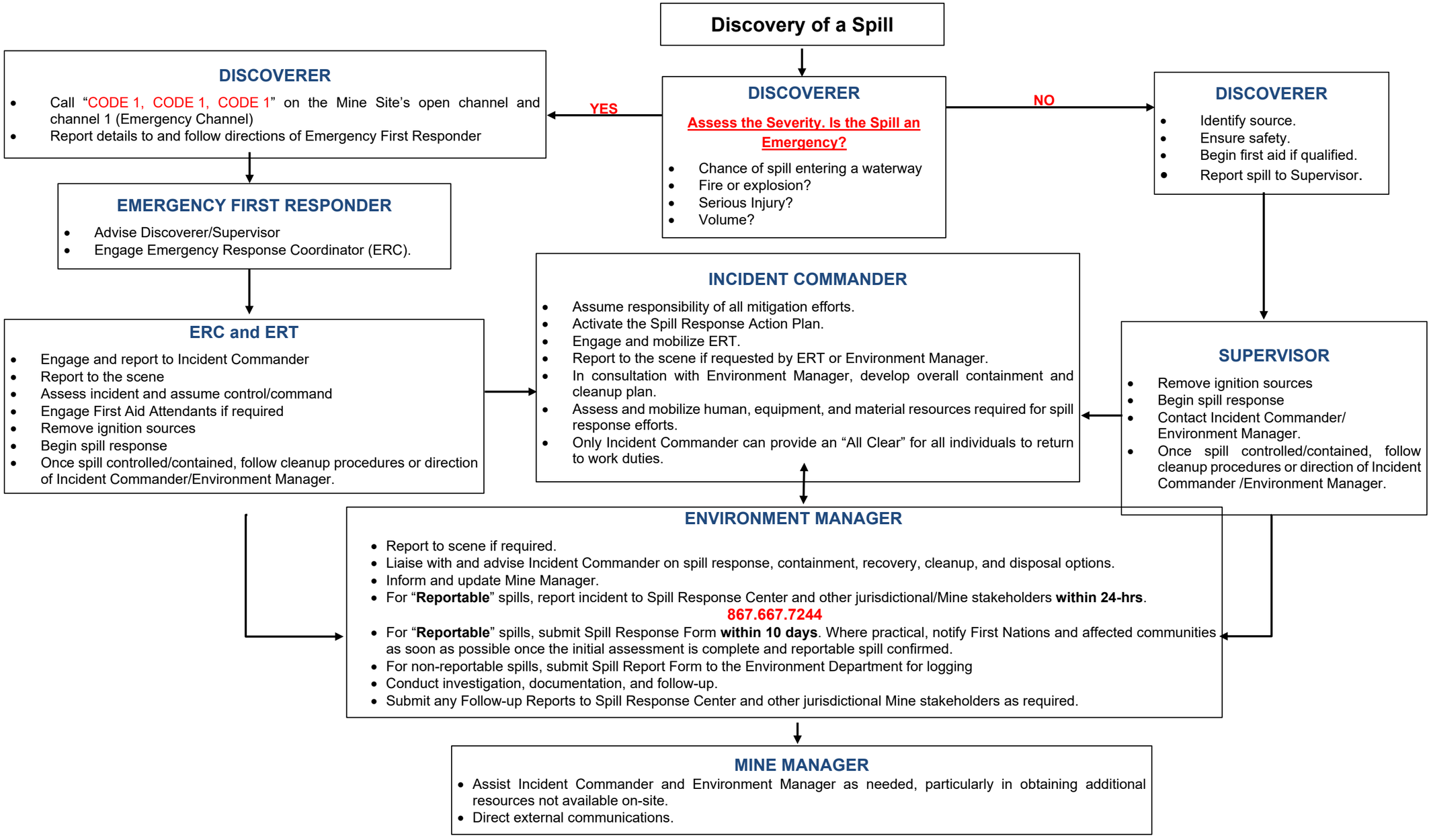


Figure 5-1 Spill/Incident Reporting Procedure

5.3 Off-Site Resources

Table 5-1 lists off-site resources that may provide assistance to the Environment Manager and ERT in responding to a reportable spill. In addition, First Nations services may be resourced for emergency response in the case of an emergency spill. Updates to the Spill Contingency Plan (SCP) will be done with ongoing input from First Nations, and opportunities for shared response can be identified during Plan updates. First Nations offices will be contacted to coordinate applicable resources, if required.

Table 5-1 Off-Site Spill Response Resources

Title	Telephone No.	Email
Horizon Charters (Whitehorse)	867 668 2177	email@tntaheli.com
Alkan Air	867 668 2107	dispatch@alkanair.com
First Nations – Main Offices		Contact Number
Tr'onkek Hwech'in Government		867.993.7100
Selkirk First Nation		867.537.3331
Na-cho Nyäk Dun First Nation		867.996.2265
White River First Nation		867.862.7802

5.4 Containment and Cleanup Procedures

Containment and clean-up efforts will depend on spill site factors including type of material spilled and its chemical properties (e.g., probability of movement, behaviour, and environmental fate), size of spill, location of spill (e.g., local terrain and soil type, proximity of water and watercourses), contaminated media (i.e., soil, water, ice, or snow), and capabilities of equipment available. As such, the MSDSs are to be consulted to ensure that safety and clean-up procedures are understood and followed.

General spill response and containment techniques for spill to land, water or snow/ice are provided in Table 5-2.

Table 5-2 General Spill Response Action and Containment Techniques

Spill	Response	Containment Technique
General Actions	• Stop source if safe to do so • Eliminate Ignition Sources – (No Smoking, turn off vehicles, DE energize electrical sources) • Block entry of spills into waterways by placing booms, building berm or trench. • Avoid contact with solvents or other chemicals. • Plan and request additional cleanup assistance as required.	• Deploy Spill Contingency Plan • Collect Spill Kit and implement containment measures
On Land	• Block entry into waterways by placing booms, building a berm or trench down-gradient from and as close as possible to the source of the spill. • Construct berms or trenches in such a way to accumulate a thick layer of free product in a single area (e.g., U- or V-shaped). • Contain with booms, earth berm or other barriers. • Place synthetic liner at the foot of and over the berm to protect underlying soil or other material. • Capture minor spills with appropriate sorbent pads. • Recover large spills with pumps or vacuum equipment. • Use absorbent sheets or peat moss to soak up residual fuel on water, ground, and on vegetation.	• Earth berm for relatively flat areas (when soil not frozen). • Earth trench (when soil not frozen or shallow bedrock). • Sorbent booms for minor spills.
On Snow and Ice	• Block entry into waterways and contain with booms, snow berm or other barrier. • Trench or ditch to intercept or contain fuel on snow, where possible. • Compact the snow around the outside perimeter of the spill area. • Construct a berm with snow, either manually with shovels or heavy machinery. • Contain and collect contaminated snow. • Use synthetic liners to contain spill on site. • Recover minor spills with appropriate sorbent pads or snow. • Recover large spills with pumps or vacuum equipment.	• Snow/Ice berms for flat areas in winter. • Snow/ice trench when sufficient snow/ice. • Sorbent boom for minor spills.
On Water	• Contain spill as close to release point as possible. • Use spill containment boom to concentrate slicks for recovery. • Protection (diversionary) booming using sorbent booms could be deployed to deflect slicks from nearby intakes or other sensitive areas. • On small spills, recover using appropriate sorbent pads. • Do not use sorbent booms/pads in fast currents and turbulent water. • Intercept moving slicks on still water areas using sorbent booms.	• Use containment booms at location where spill enters water. • Use sorbent booms across small ditches. • Use earth berms across shallow ditches.

5.4.1 Disposal of Spilled Material

Hydrocarbon contaminated soils and snow will be stored for remediation within the land treatment facility. The land treatment facility is used for the active treatment hydrocarbon or glycol-contaminated materials and is located in the waste management area. It will be able to contain up to a maximum of 2,400 m^3 of contaminated media. The land treatment facility will consist of a continuous HDPE liner between layers of geotextile and bermed material (overburden). Soils will be sampled annually to determine whether they are ready for removal or require further treatment. Accumulated water will be tested for hydrocarbons prior to discharge. Details regarding the land treatment facility are provided in the Waste and Hazardous Materials Management Plan.

Absorbent materials used in collecting spilled hydrocarbons will be incinerated or if suitable placed into the land treatment facility. Spills that have occurred on waste rock will be treated in situ (in pit, or in the Alpha WRSF). If the spill has the potential to enter waterways via surface runoff from the spill area, actions will be taken to contain the surface runoff and minimize the potential for contaminants to enter waterways. If the runoff cannot be contained, the Environment Department will remediate the contaminated area by removing contaminated material and will conduct confirmatory sampling as described in Section 5.4.2. Where contamination occurs on ore, ore will be processed as per regular operations.

5.4.2 Confirmatory Sampling

All spill sites will be sampled and remediated in compliance with the Contaminated Site Regulations and applicable protocols adopted thereunder if the threshold for reportable spills has been exceeded. Once the initial spill clean-up is complete, the Environment Department will collect samples using a grid spanning the spill area to confirm that all contaminants were removed to acceptable standards. If the analytical sampling results show that pockets of unacceptable contamination remain, these will be excavated, and the area resampled. This process will be repeated until all samples have acceptable levels of contaminates remaining at the spill site. The Environment Department will close out the spill by submitting a final report to the Yukon Environment.

6.0 INTERNAL AND EXTERNAL REPORTING

All spills (whether reportable externally or not) need to be reported by the discoverer to their immediate supervisor, who will then report it to the Environmental Department following the initial assessment of the scene. When applicable, the Environmental Department will report the incident in Enablon risk management software so that site managers, directors, and senior managers are made aware of the incident.

The incident report in Enablon requires a description of the incident, clean-up activities, root cause, photos and determines any required corrective actions.

The reporting sequence shown on Figure 5-1 will be followed to allow for an efficient and effective response, completion of an accurate spill report, timely notification of and follow-up with external (i.e., jurisdictional agencies and First Nations) and internal stakeholders.

In the case of non-emergency spills:

- The Discoverer, after identifying and assessing the spill, will report to his/her direct Supervisor.
- The Supervisor will report the spill to the Environment Manager and gather information regarding the spill to assist in completion of the required Spill reporting.
- The Environment Manager will submit the Spill Response Form to the Environment Department for logging.
- The Environment Department will retain records of all spills and be responsible for further distribution of the Spill Report records, including to First Nations.

An internal contact list will be provided during detailed design and updated frequently during mine construction, operations, and reclamation.

As per the federal and territorial regulations, the Environmental Manager (or delegate) will call the 24-hour Yukon Spill Report line should a spill of a reportable quantity occur (Table 3-1). Although several government agencies at the federal, territorial, and municipal levels may ultimately be informed, only the Yukon 24-Hour Spill Report line is required for reporting purposes. The environmental person on site will ensure that the appropriate information is collected before reporting to the Spill Report line. Any spill of an amount greater than those listed in Table 3-1, or a spill of any amount that enters the Yukon River or a tributary of the river, is a “reportable spill”.

The following information should be provided to the 24-Hour Spill Report line:

- Name and contact information
- Nature and quantity of product spilled
- Quality of product (thin, viscous, etc.)
- Location of spill
- Distance to nearest watercourse and drinking water well
- Description of what happened
- Responsible party
- Actions to contain the spill.

When reporting the spill to the Spill Report line, the Environmental Manager (or delegate) will obtain the Environment Yukon Spill Reporting Number and first/last name of the person to whom the report has been made to (in the event of a reporting discrepancy).

The Environment Manager will also contact: the Energy Mines and Resources Mining Inspector; the Health and Social Services Environmental Health Office; and Environment Canada Enforcement Office via email after discovery of a reportable spill to provide information regarding the spill. The SER Manager (or delegate) will contact First Nations regarding the reportable spill as soon as possible once the initial assessment of the spill is complete and confirmation of a reportable spill has been determined. If applicable, local authorities of downstream communities will also be notified by the SER Manager.

In the case of an emergency spill, the Environmental Manager will report the spill to the Yukon Spill Centre as soon as it is feasible, and to other jurisdictional/Mine stakeholders and First Nations partners within 24 hrs.

A detailed written report will be submitted to the regulatory authorities and First Nations within 10 days of the event. The contact information for the various Project employees, emergency response and external reporting personnel is provided in Table 6-1. This table is to be updated on a frequent basis.

Table 6-1 External Emergency Contacts – Regulatory and Health Agencies, and First Nations

Resource	Email	Contact Number
Coffee Project Internal Communications Contact Info		
Jasmin Dobson, Environmental Superintendent	Jasmin.Dobson@newmont.com	867-334-7698
Jennie Gjertsen, Environmental and Permitting Manager	Jennie.Gjertsen@newmont.com	867-455-5015
Christian Roldan Study Manager – Coffee Project	Christian.Roldan@newmont.com	647-923-5481
Emergency Phone Contacts		
Yukon 24-Hour Spill Line		867 667-7244
RCMP 24-Hour Emergency Number		867 993 5555
Forest Fire Reporting		1-888-798-3473
CANUTEC-Dangerous Goods Help (Transport Canada)		1-888-CANUTEC or 613 996-6666
Fire Department – Dawson (Emergency)		867 863-2222
Police – Dawson		867 863-5555
Health Centre – Dawson		867 863-4444
Hospital – Whitehorse		867 667-8700
Fire Department – Whitehorse		867 668-8699 or 867 668-2462
Police – Whitehorse		867 667-5555
Environment Canada – Yukon		867 667 3400
Fisheries and Oceans Canada - Yukon		867 393 6722
YG Department of Environment – Monitoring and Inspections		867 667-3227

Emergency Phone Contacts	
YG Department of Environment – Conservation Officer Services Branch	867 667 8005
YG Environmental Protection Branch	867 667-3436
YG EMR, Client Services and Inspections	867 667-3209
Yukon Workers' Safety and Compensation Board	1-800-661-0443

External Reporting and Contacts for Submission of Spill Reports		
Name	Contact Information	Contact Authority
YG EMR, Matthew Jenner, Natural Resources Officer - Mining	matthew.jenner@gov.yk.ca; 867-456-3839	Environmental Manager/Superintendent
Tr'ondëk Hwëch'in First Nation	Environmental Committee	SER Manager to contact Tr'ondëk Hwëch'in Environmental Committee
Selkirk First Nation		SER Manager to contact Selkirk First Nation
First Nation of Na-cho Nyak Dun		SER Manager to contact First Nation of Na-cho Nyak Dun
White River First Nation		SER Manager to contact White River First Nation
YG Environmental Health Services, Wilberforce Biina, Environmental Health Officer	Wilberforce.Biina@gov.yk.ca; 867-456-5599	Environmental Manager/Superintendent
Environment Canada, Travis Teele, Enforcement Officer	Travis.Teele@ec.gc.ca; 867-393-6705	Environmental Manager/Superintendent

7.0 ROUTINE MONITORING AND MAINTENANCE

Regular and frequent monitoring and inspections by the Environment Department will confirm that the mine remains safe, stable, and fully compliant with all authorizations throughout its mine life. Inspections will assist in obtaining better environmental outcomes for all activities, including the prevention of spills, and more timely maintenance of mine components. Additionally, regular checks of heavy machinery, processing equipment, dispensing equipment, and other mine facilities could result in early resolution of any deficiencies, and lead to less ongoing maintenance and repair of mine components, as well as a reduction in the risk of adverse environmental effects occurring. Maintenance logs will be kept on-site.

At the barge crossing locations on the Stewart and Yukon River, barge personnel will check the condition of the landing's spill containment features, such as collection ponds on a weekly basis to help prevent hydrocarbon runoff into the adjacent rivers.

8.0 TRAINING REQUIREMENTS

The Project has a comprehensive training program that ensures all workers and supervisors are aware of their responsibilities and the practices that personnel and contractors must adhere to. These training programs will include actions in the event of a spill, as well as spill reporting procedures. Site orientations will ensure employees, contractors, and visitors understand the steps to be undertaken in the event of a spill and what will be done with any resulting contaminated material. All employees and contractors will be shown where spill kits are stored, will be aware of their contents, and will be familiar with spill equipment and responding to spills.

Additional training will be provided to on-site personnel involved with the handling, use, storage, and transportation of hazardous substances. Training programs for these personnel will include regular WHMIS, and Transportation of Dangerous Goods, as required, including annual refresher training.

Targeted, job-specific training, with focus on spill prevention and response techniques, will be provided to smaller groups as required. These will include, but not limited to, maintenance personnel, waste and water truck operators, fueling personnel, and warehouse workers. The Environment Department will regularly attend safety meetings or toolbox talks to provide information on spill response and reporting procedures. The H&S Department will be familiar with and have up to date MSDS sheets for all hazardous material used on-site.

8.1 Emergency Response Team training

Newmont will ensure that the designated ERT has sufficient members present on-site at all times. All members of the ERT will be trained and familiar with emergency and spill response resources, including their location and access, the Spill Contingency Plan, and appropriate emergency spill response methodologies. The ERT members will receive extensive hazardous materials training and learn how to respond while wearing PPE. This training will also be given to NAR construction workers, due to the remote nature of NAR work and small crew sizes. However, unlike Mine Site ERT members who will be trained for emergencies anticipated during mine construction and operation, road crew training will be tailored specifically for road construction activities.

The training will include the following:

- Review of the Spill Contingency Plan and responsibilities of the ERT members.
- The nature, status, and location of fuel and chemical storage facilities, either on site or in use for NAR construction.
- The locations of on-site spill response equipment and how to use them; or, for the NAR construction, the location and use of spill response equipment available for road construction.
- The locations of hazardous materials and their MSDS sheets.
- Understanding the contents of MSDS sheets, specifically hazards posed by spills, PPE required, and steps to be taken in responding to a spill.
- Likely causes and possible effects of spills.
- Responding to fires or explosions.
- Emergency contact lists.
- Worker health and safety risks and precautions during emergency interventions.

- WHIMIS, Transportation of Dangerous Goods, and Hazmat emergency responses.
- Communication methods and signals.
- Emergency evacuation.
- Emergency equipment and their use.

Each member of the ERT can be expected to have eight hours of training monthly. In addition, desktop and/or field emergency spill response drills will be carried out to help prepare the ERT and other mine staff to respond to emergency spills safely as well as identify any deficiencies in the equipment or processes in place.

The Emergency Response Team will be comprised of volunteer employees and contractors who are trained in the emergency response procedures listed above. Newmont will provide opportunities for all employees to become volunteer members of the Emergency Response Team and will hold regular training sessions and exercises. Groups that are typically underrepresented (First Nations employees, women etc.) will be encouraged to participate in the ERT.

9.0 REFERENCES

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APPENDIX A
Spill Response Form

Newmont™ COFFEE

SPILL RESPONSE FORM

Yukon Spill Report Centre: 867-667-7244

Spill Description

Report Date & Time: _____ Date & Time of Spill (if known)_____

Report Written By: _____ Project Name & Number: _____

Location of Spill & Direction (if moving): _____

Duration of Spill: _____ Source of Spill: _____

Cause of Spill (Equip failure, Human Error, etc.) _____

Material Spilled: _____

MSDS Attached: ☐

Estimate Volumes: Spilled: _____ Contained: _____

Recovered: _____ Disposed: _____

Ground Water Impacted? ☐ Surface Water Impacted? ☐

Contained within Berm? ☐ Area & Vertical Extent of Spill: _____ x _____.

Soil Description: _____

Weather Conditions: _____

Report Distance to Nearest:

Surface Water: _____ Wetlands: _____ Buildings: _____

Livestock _____ Water Intakes: _____

Injuries Resulting from Spill: _____

Who was at the Scene (Name, organization, position)

_____

_____

Were pictures taken? ☐ Was a sample taken? ☐

Type of Hazard: Health ☐ Explosive ☐ Flammable ☐ Chemical ☐

Wildlife ☐

Corrective Action:

Describe immediate response (how stopped and contained): _____

_____

_____

Newmont™ COFFEE

SPILL RESPONSE FORM

Describe time of recovery: _____

_____

_____

Describe the method of disposal: _____

_____

_____

Describe further clean-up activities proposed: _____

_____

_____

Describe measures taken to prevent problem from re-occuring: _____

_____

_____

Other Notifications

List the parties and agencies notified:

DATE	AGENCY	NAME	PHONE	RESPONSE

Spill/Release Tracking No: _____

APPENDIX B
Material Safety Data Sheets

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: MOBIL ANTIFREEZE EXTRA
Product Description: Glycol
Product Code: 330977, 351010601020
Intended Use: Antifreeze/coolant

COMPANY IDENTIFICATION

Supplier: **East Coast Lubes Pty Ltd (Queensland and Northern Territory)**
A.B.N. 37 117 203 611
Cnr North and Mort Streets
Toowoomba, Queensland 4350 Australia

24 Hour Environmental / Health Emergency Telephone 1300 131 001
Supplier General Contact 1800 069 019

Supplier: **Southern Cross Lubes (Victoria and Tasmania)**
58-66 Ajax Road
Altona, Victoria 3018, Australia

24 Hour Environmental / Health Emergency Telephone 1300 131 001
Product Technical Information 1300 466 245
Supplier General Contact 1300 552 861

Supplier: **Perkal Pty Ltd Trading as Statewide Oil (Western Australia)**
A.B.N. 43 009 283 363
14 Beete Street
Welshpool, Western Australia 6106 Australia

24 Hour Environmental / Health Emergency Telephone (8:00am to 4:30pm Mon to Fri) 1300 919 904
Product Technical Information (08) 9350 6777
Supplier General Contact (08) 9350 6777

Supplier: **Perkal Pty Ltd Trading as Roto Oil (South Australia)**
A.B.N. 43 009 283 363
6-10 Streiff Rd
Wingfield, South Australia 5013 Australia

24 Hour Environmental / Health Emergency Telephone (8:00am to 4:30pm Mon to Fri) 1300 919 904
Product Technical Information (08) 8359 8995
Supplier General Contact (08) 8359 8995

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

GHS CLASSIFICATION:

Acute oral toxicant: Category 4. Specific target organ toxicant (repeated exposure): Category 2.

GHS Label Elements:

Pictogram:



Signal Word: Warning

Hazard Statements:

Health: H302: Harmful if swallowed. H373: May cause damage to organs through prolonged or repeated exposure. Kidney

Precautionary Statements:

General: P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children. P103: Read label before use.
Prevention: P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P264: Wash skin thoroughly after handling. P270: Do not eat, drink or smoke when using this product. P280: Wear protective gloves and clothing.
Response: P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P308 + P313: IF exposed or concerned: Get medical advice/attention. P314: Get medical advice/attention if you feel unwell. P330: Rinse mouth.
Storage: P405: Store locked up.
Disposal: P501: Dispose of contents and container in accordance with local regulations.

Contains: ETHYLENE GLYCOL

Other hazard information:

Physical / Chemical Hazards:
No significant hazards.

Health Hazards:
High-pressure injection under skin may cause serious damage. Ingestion may cause serious adverse effects and may be fatal. May cause kidney failure and central nervous system effects. Prolonged exposure to elevated concentrations of mist or liquid may cause irritation of the skin, eyes, and respiratory tract.

Environmental Hazards:
No significant hazards.

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 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
2-ETHYLHEXANOIC ACID, SODIUM SALT	19766-89-3	< 3.0%	H361(D)
DISODIUM TETRABORATE PENTAHYDRATE	12179-04-3	< 1.0%	H319(2A), H360(1B)(D), H360(1B)(F)
ETHYLENE GLYCOL	107-21-1	> 90.0%	H302, H373

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. Other ingredients determined not to be hazardous up to 100%.

SECTION 4 FIRST AID MEASURES

INHALATION

Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

Seek immediate medical attention.

NOTE TO PHYSICIAN

This product contains ethylene glycol and/or diethylene glycol which, if ingested, are metabolized to toxic metabolites by the enzyme alcohol dehydrogenase, for which ethanol and 4-methylpyrazole {U.S. drug name Fomepizole, trade name Antizol} are antagonists. Administration of oral or intravenous ethanol or intravenous 4-methylpyrazole may arrest further metabolism of this material and thereby ameliorate the toxicity. Use of ethanol or 4-methylpyrazole does not affect toxic metabolites that are already present and is not a substitute for hemodialysis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

Inappropriate Extinguishing Media: Straight streams of water or standard foam

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.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: >120°C (248°F) [EN/ISO 2719]
Flammable Limits (Approximate volume % in air): LEL: 4.9 UEL: 14.6
Autoignition Temperature: >440°C (824°F) [DIN 51794]

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

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

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Do not touch or walk through spilled material. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Material will sink. Remove material, as much as possible, using mechanical equipment.

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

Remove debris in path of spill and remove contaminated debris from shoreline and water surface. Dispose of according to local regulations. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapour. Avoid contact with skin. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

Material is defined under the National Standard [NOHSC:1015] Storage and Handling of Workplace Dangerous Goods.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Source
DISODIUM TETRABORATE PENTAHYDRATE		TWA	1 mg/m3			Australia OELs
DISODIUM TETRABORATE PENTAHYDRATE	Inhalable fraction.	STEL	6 mg/m3			ACGIH
DISODIUM TETRABORATE PENTAHYDRATE	Inhalable fraction.	TWA	2 mg/m3			ACGIH
ETHYLENE GLYCOL	Vapour.	STEL	104 mg/m3	40 ppm	Skin	Australia OELs
ETHYLENE GLYCOL	Particulate.	TWA	10 mg/m3		Skin	Australia OELs
ETHYLENE GLYCOL	Vapour.	TWA	52 mg/m3	20 ppm	Skin	Australia OELs
ETHYLENE GLYCOL	Aerosol.	Ceiling	100 mg/m3			ACGIH

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

Biological limits

No biological limits allocated.

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:

Particulate

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

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

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

Nitrile,Viton

Chemical resistant gloves are recommended.

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:

Chemical/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. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Blue-Green
Odour: Odourless
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 20 °C): 1.12
Flammability (Solid, Gas): N/A
Flash Point [Method]: >120°C (248°F) [EN/ISO 2719]
Flammable Limits (Approximate volume % in air): LEL: 4.9 UEL: 14.6
Autoignition Temperature: >440°C (824°F) [DIN 51794]
Boiling Point / Range: 170°C (338°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: N/D
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Complete
Viscosity: [N/D at 40ºC]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

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

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

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

INCOMPATIBLE MATERIALS: Strong Acids, Strong oxidisers

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity (Human): LDLo 100 ml	Moderately toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	

Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: No end point data for material.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Contains a substance that may be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on assessment of the components.

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ETHYLENE GLYCOL	Oral Lethality: LD 50 4700 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Kidney

Contains:

ETHYLENE GLYCOL (EG): Repeated high oral exposure has caused kidney damage, neurological effects, degeneration of the liver and changes in blood chemistry and circulating blood cells in laboratory animals. Repeated overexposure has the potential to cause similar toxic effects in humans. EG causes developmental and reproductive effects at high dose levels in laboratory animals. The relevance of these findings to humans is uncertain. However, as a precaution, avoid exposure during pregnancy. Sodium tetraborate: Adverse effects on fertility and fetal development have been observed in laboratory animals.

IARC Classification:

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1 2 = IARC 2A 3 = IARC 2B

SECTION 12 ECOLOGICAL INFORMATION

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

ECOTOXICITY

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

MOBILITY

Material -- Expected to remain in water or migrate through soil.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13 DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

Even though this product is readily biodegradable, it must not be indiscriminately discarded into the environment. 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.

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

SECTION 14 TRANSPORT INFORMATION

LAND (ADG) : Not Regulated for Land Transport

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

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport
, EHS

SECTION 15 REGULATORY INFORMATION

This material is considered hazardous according to Australia Model Work Health and Safety Regulations.

Product is not regulated according to Australian Dangerous Goods Code.

Poison Schedule number allocated by the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) established under the Therapeutic Goods Act.
POISON SCHEDULE NUMBER: S5

AS1940 COMBUSTIBLE CLASS: C1

REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

Listed or exempt from listing/notification on the following chemical inventories: IECSC, KECI, TSCA
Special Cases:

Inventory	Status
AICS	Restrictions Apply
ENCS	Restrictions Apply

SECTION 16 OTHER INFORMATION

KEY TO ABBREVIATIONS AND ACRONYMS:

N/D = Not determined, N/A = Not applicable, STEL = Short-Term Exposure Limit, TWA = Time-Weighted Average

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A
H360(1B)(D): May damage the unborn child; Repro Tox, Cat 1B (Develop)
H360(1B)(F): May damage fertility; Repro Tox, Cat 1B (Fertility)
H361(D): Suspected of damaging the unborn child; Repro Tox, Cat 2 (Develop)
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Company Logo (Fld 1) information was modified.
GHS Precautionary Statements - Prevention information was modified.
GHS Target Organ List information was added.
GHS Target Organ List information was deleted.
Perkal Pty Ltd Trading as Roto Oil (South Australia): Section 01: Supplier Mailing Address information was added.
Perkal Pty Ltd Trading as Roto Oil (South Australia): Section 01: Supplier Mailing Address information was deleted.
Perkal Pty Ltd Trading as Statewide Oil (Western Australia): Section 01: Supplier Mailing Address information was added.
Perkal Pty Ltd Trading as Statewide Oil (Western Australia): Section 01: Supplier Mailing Address information was

deleted.
Section 05: Fire Fighting Measures - Fire Fighting Instruction information was modified.
Section 16: Global Disclaimer information was modified.
Southern Cross Lubes (Victoria and Tasmania): Section 01: Supplier Mailing Address information was added.
Southern Cross Oil Pty Ltd Trading as Southern Cross Lubes (Victoria and Tasmania): Section 01: Supplier Mailing Address information was deleted.

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DGN: 7076356DAU (551452)

Prepared by: Exxon Mobil Corporation
EMBSI, Clinton NJ USA
Contact Point: See Section 1 for Local Contact number

End of (M)SDS

Gas Line Antifreeze

SECTION 1. IDENTIFICATION

Product Identifier	Gas Line Antifreeze
Other Means of Identification	15-355, 15-356, 35-351SO, 35-355C, 35-355H, 35-355WM, 35-356CHR, 35-356CQ, 35-356LAU, 35-356PC, 35-356SO, 35-356SS
Other Identification	Methyl Hydrate
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	1605

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid - Category 2; Acute toxicity (Oral) - Category 3; Acute toxicity (Dermal) - Category 3; Acute toxicity (Inhalation) - Category 3; Specific target organ toxicity (single exposure) - Category 1

GHS Label Elements



Signal Word:
Danger

Hazard Statement(s):

H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs (eyes) if swallowed.

Precautionary Statement(s):

Prevention:

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.
P260	Do not breathe fume, mist, vapours, spray.
P264	Wash hands and skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing.

Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P330 Rinse mouth.
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.
P363 Wash contaminated clothing before reuse.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P321 Specific treatment (see supplemental first aid instruction on this label).
P370 + P378 In case of fire: Use appropriate foam, carbon dioxide, dry chemical powder, water spray or fog to extinguish.

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.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance:

Chemical Name	CAS No.	%	Other Identifiers
Methanol	67-56-1	60-100	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

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. If breathing has stopped, trained personnel should begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Avoid direct contact. Wear chemical protective clothing if necessary. Take off immediately 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. Get medical advice/attention if you feel unwell or are concerned. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Avoid direct contact. Wear chemical protective gloves if necessary. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Ingestion

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. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor. Treatment is urgently required.

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, liver, nervous system.

Special Instructions

Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complaints. Treatment with ipecac or lavage is indicated in any patient presenting within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.

Medical Conditions Aggravated by Exposure

Respiratory conditions, dermatitis, eye conditions.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder or appropriate foam. Special "alcohol resistant fire-fighting foams".

Unsuitable Extinguishing Media

Water is not effective for extinguishing a fire. It may not cool product below its flash point.

Specific Hazards Arising from the Chemical

Highly 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. Even dilute solutions in water may be flammable. May travel a considerable distance to a source of ignition and flash back to a leak or open container. See Section 9 (Physical and Chemical Properties) for flash point and explosive limits. Burns with an invisible flame. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a fire hazard.
In a fire, the following hazardous materials may be generated: toxic chemicals; very toxic carbon monoxide, carbon dioxide; very toxic, flammable formaldehyde.

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

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. 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. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient. Distant ignition and flashback are possible.

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

	ACGIH TLV®		OSHA PEL		AIHA WEEL	
Chemical Name	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Methanol	200 ppm	250 ppm	200 ppm	250 ppm		

Appropriate Engineering Controls

General ventilation is usually adequate. For large scale use of this product: do not allow product to accumulate in the air in work or storage areas, or in confined spaces. Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof 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 safety shower in work area, 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.
Nitrile rubber.

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 organic vapour cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Clear colourless liquid.
Odour	Pungent
Odour Threshold	4.2 - 5960 ppm (5.5 - 7794.2 mg/m3)
pH	Not available
Melting Point/Freezing Point	-97.7 ºC (-143.9 ºF) (melting); -97.7 ºC (-143.9 ºF) (freezing)
Initial Boiling Point/Range	64.7 ºC (148.5 ºF)
Flash Point	11 ºC (52 ºF) (closed cup)
Evaporation Rate	4.1 (n-butyl acetate = 1)
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	36% (upper); 6% (lower)
Vapour Pressure	96.0 mm Hg (12.8 kPa) at 20 ºC
Vapour Density (air = 1)	1.1
Relative Density (water = 1)	0.791 at 25 ºC
Solubility	Soluble in water; Soluble in all proportions in alcohols (e.g. ethanol).
Partition Coefficient, n-Octanol/Water (Log Kow)	-0.77 at 20 ºC
Auto-ignition Temperature	464 ºC (867 ºF)
Decomposition Temperature	Not available
Viscosity	0.686 - 0.699 mm2/s at 25 ºC (kinematic); 0.54 - 0.55 mPa.s at 20 ºC (dynamic)

Other Information

Physical State	Liquid
Molecular Weight	32.04

SECTION 10. STABILITY AND REACTIVITY

Reactivity

None known.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None known.

Conditions to Avoid

Heat. Open flames, sparks, static discharge, heat and other ignition sources. Temperatures above 11.0 ºC (51.8 ºF)

Incompatible Materials

Reacts violently with: reacts explosively with: strong oxidizing agents (e.g. perchloric acid).
Highly reactive. Strong acids (e.g. hydrochloric acid).

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide; very toxic, flammable formaldehyde.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Ingestion; eye contact; skin contact; inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Methanol	83867.5 mg/m3 (rat) (4-hour exposure)	5628 mg/kg (rat)	15800 mg/kg (rabbit)

LC50: Not applicable.

LD50 (oral): Not applicable.

LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

Human experience shows very mild irritation.

Serious Eye Damage/Irritation

Animal tests show serious eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May be harmful based on human experience and animal tests. Depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness.
Toxic, can cause death based on human experience. At high concentrations.

Skin Absorption

Harmful based on human experience. Can cause effects as described for inhalation. Depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness.

Ingestion

Toxic, can cause death depression of the central nervous system, impaired vision and blindness. In some cases, there may be delayed effects on the nervous system. Symptoms may include headache, nausea, vomiting, dizziness, drowsiness and confusion. A severe exposure may cause stomach pain, muscle pain, difficult breathing and coma. Vision can be impaired and permanent blindness can result. There may be other permanent effects on the nervous system e.g. tremor, seizures.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause damage to organs based on limited evidence. If inhaled: effects on the central nervous system. Symptoms may include restlessness, reduced ability to think, muscle tremors, memory loss and personality changes. effects similar to STOT (Specific Target Organ Toxicity) - Single Exposure, as described above.
May cause 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 If inhaled: at high concentrations visual distubances, cataracts, opacities.
May cause If inhaled: at high concentrations harmful effects on the liver.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Methanol	Not Listed	Not designated	Not Listed	Not Listed

Reproductive Toxicity

Development of Offspring

Animal studies show effects on the offspring. If inhaled: known to cause: decreased weight, birth defects. Teratogenic(external, soft tissue and skeletal defects) embryotoxic (late resorptions).

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Effects on or via Lactation

May cause effects on or via lacation. Can transfer to mother's milk.

Germ Cell Mutagenicity

Conclusions cannot be drawn from the limited studies available.

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
Methanol	15400 mg/L (Lepomis macrochirus (bluegill); 96-hour)	10000 mg/L (Daphnia magna (water flea); 48-hour)		

Chronic Aquatic Toxicity

Chemical Name	NOEC Fish	EC50 Fish	NOEC Crustacea	EC50 Crustacea
Methanol	7900 mg/L (Lepomis macrochirus (bluegill); 200-hrs)			

Persistence and Degradability

Degrades rapidly based on quantitative tests.

Bioaccumulative Potential

This product and its degradation products are not expected to bioaccumulate.

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	1230	METHANOL	3 (6.1)	II
US DOT	1230	METHANOL	3 (6.1)	II

Environmental Hazards: Not applicable

Special Precautions for User: Please note: In containers of 1 L (1Kg) capacity or less this product is classified as a "Limited Quantities""Consumer Commodity" under TDG regulations.
In containers of 1 L (1Kg) this product is qualified as a "consumer commodity" ORM-D under DOT

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

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 birth defects.

SECTION 16. OTHER INFORMATION

SDS Prepared By: Compliance and Regulatory Department

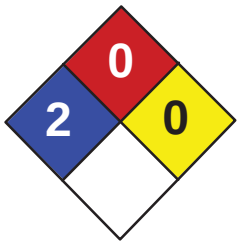
Phone No.: 905-878-5544

Date of Preparation: November 09, 2015

Additional Information: We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative.
Please send us your request by visiting our website at www.recochem.com.

Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.

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



Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Copper sulfate pentahydrate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper sulfate pentahydrate

Catalog Codes: SLC3778, SLC4567, SLC1774, SLC3565, SLC5353

CAS#: 7758-99-8

RTECS: GL8900000

TSCA: TSCA 8(b) inventory: No products were found.

CI#: Not applicable.

Synonym: Blue vitriol; Copper (II) Sulfate Pentahydrate

Chemical Name: Cupric sulfate pentrahydrate

Chemical Formula: CuSO4.5H2O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Copper sulfate pentahydrate	7758-99-8	100

Toxicological Data on Ingredients: Copper sulfate pentahydrate: ORAL (LD50): Acute: 300 mg/kg [Rat.]. DERMAL (LD50): Acute: >2000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When heated to decomposition it emits toxic fumes. Solutions are acidic and can react with magnesium to evolve flammable hydrogen gas

Special Remarks on Explosion Hazards: Nitromethanes and copper salts spontaneously form explosive materials

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 (mg/m3) from ACGIH (TLV) [United States] Inhalation TWA: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 (mg/m3) from NIOSH InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline granules solid. Powdered solid.)

Odor: Odorless.

Taste: Nauseous metallic.

Molecular Weight: 249.69 g/mole

Color: Blue. (Light.)

pH (1% soln/water): Not available.

Boiling Point: 150°C (302°F)

Melting Point: 110°C (230°F)

Critical Temperature: Not available.

Specific Gravity: 2.28 @ 15.6 deg. C(Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol.

Solubility:
Easily soluble in hot water. Soluble in cold water, methanol. Solubility in water: 31.6 g/100 ml @ 0 deg. C.; 203.3 g/100 ml @ 100 deg. C Solubility in methanol: 15.6 g/100 ml @ 18 deg. C. Insoluble in ethanol. It readily forms alkaline complexes at sufficiently high concentrations of amines or alkali cyanides. Practically insoluble in most organic solvents.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat (high temperatures), incompatible materials, exposure to air

Incompatibility with various substances: Reactive with metals, alkalis.

Corrosivity: Highly corrosive in presence of steel.

Special Remarks on Reactivity:
Air Sensitive. Slowly efforescent in air. Solutions of hyprobromite are decomposed by powerful catalytic action of cupric ions, even as impurities. Incompatible with finely powdered metals.

Special Remarks on Corrosivity:
Corrosive to finely powdered metals. Very corrosive to plain steel

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 300 mg/kg [Rat.]. Acute dermal toxicity (LD50): >2000 mg/kg [Rat].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. May cause damage to the following organs: kidneys, liver.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 1088 mg/kg

Special Remarks on Chronic Effects on Humans: May affect genetic material based on animal data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. May cause skin burns. It may cause and itching allergic eczema. Eyes: Causes eye irritation. May cause eye burns. It may cause conjunctivitis, corneal discoloration, ulceration and turbidity of the cornea. Inhalation: Causes respiratory tract (nose, throat, lung) irritation with coughing and wheezing. May cause ulceration and perforation of the nasal septum if inhaled in excessive quantities. Burning copper sulfate may result in irritating and poisonous gases which may irritate the respiratory tract and lungs, and may cause fume metal fever which is characterized by flu-like symptoms such as fever, chills, muscle aches. Ingestion: Harmful if swallowed. May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, metallic taste, burning sensation in the stomach or epigastrum, abdominal pain, and possible gastrointestinal tract bleeding. May affect metabolism(metabolic acidosis), liver (liver damage, jaundice), blood (Methemoglobin, hemalytic anemia), urinary system (kidney damage, hematuria, hemoglobinuria, albuminuria), behavior/nervous systems (somnolence, tremor, psychosis, muscle weakness, coma), cardiovascular system (lowering of blood pressure, dysthrythmia). Oral mucosa, vomitus, stools, and saliva may be stained blue or green following ingestion. Aspiration pneumonia may develop following emesis and CNS depression. Chronic Potential Health Effects: Skin: Repeated or prolonged skin contact may cause thickening of the skin.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 0.1 ppm 48 hours [Goldfish]. 0.1 mg/l 96 hours [Rainbow Trout]. 2.5 mg/l 96 hours [Rainbow Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation:
If released to soil, copper sulfate may leach to groundwater, be partly oxidized, or bind to humic materials, clay, or hydrous of iron and manganese. In water, it will bind to carbonates as well as humic materials, clay and hydrous oxides of iron and manganese. Copper is accumulated by plants and animals, but it does not appear to biomagnify from plants to animals. This lack of biomagnification appears common with heavy metals. In air, copper aerosols (in general) have a residence time of 2 to 10 days in an unpolluted atmosphere and 0.1 to >4 in a polluted, urban areas.

Section 13: Disposal Considerations

Waste Disposal:
Copper dusts or mist or copper compounds may be disposed of in Group III sealed containers in a secure sanitary landfill. Copper containing soluble wastes can be concentrated through the use of ion exchange, reverse osmosis, or evaporators to the point where copper can be electrolytically removed and sent to a reclaiming firm. If recovery is not feasible, the copper can be precipitated through the use of caustics and the sludge depositied in a chemical waste landfill. Be sure to consult with authorities (waste regulators). Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 9: Miscellaneous hazardous material.

Identification: : Environmentally hazardous substance, n.o.s. (Cupric Sulfate) UNNA: 3077 PG: III

Special Provisions for Transport:
additional markings "Marine Pollutant" - required for bulk shipments. The words "Marine Pollutant" must be entered on the shipping paper in association iwth the basic DOT description for bulk shipments.

Section 15: Other Regulatory Information

Federal and State Regulations:
SARA 313 toxic chemical notification and release reporting: Copper compounds CERCLA: Hazardous substances.: Copper sulfate pentahydrate: 10 lbs. (4.536 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R36/38- Irritating to eyes and skin. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S22- Do not breathe dust. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

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

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References:
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

Other Special Considerations: Not available.

Created: 10/09/2005 05:01 PM

Last Updated: 11/01/2010 12:00 PM

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Safety Data Sheet

Section 1 – Identification

Product Identifier: SuperClean Degreaser and Foaming Degreaser

Other means of Identification: Cleaning Solution

Name and Address of Responsible Parties:

SuperClean Brands, LLC
1380 Corporate Center Curve, Suite 107
Eagan, MN 55121

Information Telephone #: 1-651-365-7500
24 Hr. Emergency Telephone Number: 1-800-424-9300
Contract Number: CCN644158

Section 2 – Hazards Identification

Classification of the Chemical: Clear light purple liquid. Citrus odor.

This material is classified as hazardous under OSHA regulations (29 CFR 1910.1200) (Hazcom 2012).

Hazardous classification: Corrosive to Metals – Category 1
Skin irritation – Category 2
Eye irritation – Category 2A

Label elements:

Signal Word: Warning

Hazard Statements: Corrosive liquid.
May cause skin irritation.
May cause serious eye irritation.

Precautionary Statements: Keep only in original container.
Store in corrosive resistant container with inner liner.
Absorb spillage to prevent material damage.
Wash hands thoroughly after handling.
If on Skin: Wash with plenty of soap and water.

Section 2 – Hazards Identification (Continued)

If skin irritation occurs get medical advice/attention.
Take off contaminated clothing and wash before reuse.
Wear protective gloves.
Wear eye protection such as goggles or safety glasses with side shields.
If in eyes: Rinse cautiously with water for 15 minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists get medical advice/attention.
Do not eat, drink or smoke when using this product.
If swallowed: Immediately call a poison center/physician.
Rinse mouth.
Dispose of contents/container in accordance with local, state, federal or international regulations.

Hazard Pictogram(s):



Other Hazards not otherwise classified:
This product contains 7% ingredients of an unknown acute toxicity. See section 11 for more information.

Section 3 – Composition/Information on Ingredients

Chemical Name, Common Name	CAS #	Concentration wt/wt(*)
Sodium Metasilicate	6834-92-0	<5
Sodium hydroxide	1310-73-2	<5
Surfactant, blend	Trade secret	1-10

*** Note: The exact concentrations of the chemical(s) above are being withheld as a trade secret.**

Section 4 – First-Aid Measures

Description of first aid measures:

Inhalation: If inhaled remove victim to fresh air and keep at rest. Call a poison center or physician if you feel unwell.

Skin contact: Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse. If skin irritation occurs get medical advice/attention.

Eye contact: If product gets in eyes flush with water for at least 15 minutes. If eye irritation persists seek medical advice/attention.

Ingestion: Do NOT induce vomiting unless instructed by medical personal. Never give anything by mouth to an unconscious person. Get medical attention.

Most important symptoms and effects, both acute and delayed:

May cause skin irritation.
May cause serious eye irritation.
Ingestion may cause gastrointestinal irritation, nausea, vomiting, diarrhea and burns to the mouth, throat and esophagus.

Indication of any immediate medical attention and special treatment needed:
Treat symptomatically.

Section 5 – Fire-Fighting Measures

Extinguishing media:
Suitable extinguishing media: Water fog, Carbon dioxide, Dry chemical, Foam.
Unsuitable extinguishing media: Not available.

Special hazards arising from the substance or mixture: None known.

Flammability classification: Not flammable by OSHA/WHMIS criteria.

Hazardous combustion products: Carbon oxides, other unidentified organic compounds.

Special protective equipment and precautions for firefighters:
Protective equipment for fire-fighters: Firefighters should wear proper protective equipment (Bunker gear) and self-contained breathing apparatus with full face operated in positive pressure mode.

Section 6 – Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:
All persons dealing with the clean-up should the appropriate chemically protective equipment. Keep people away from and upwind of spill/leak. Restrict access to area until completion of clean-up.

Methods and materials for containment and clean up:
If possible, prevention measures should be taken to stop any chemical from entering the ground water system. Ventilate the area. Scoop up material and place into suitable container(s). Dispose of according to local, state and federal regulations.

Section 7 – Handling and Storage

Precautions for safe handling:
Obtain special instructions before use. Do not handle until all safety precautions have been read and understand. Wear protective gloves and eye/face protection. Adequate ventilation should be supplied. Avoid prolonged contact with skin, eyes and clothing. Keep away from heat. Keep container tightly closed.

Conditions for safe storage:
Store in cool, dry and well ventilated place. Containers should be clearly identified, clear of obstructions and accessible only to authorized personnel. Have appropriate fire extinguishers/sprinkler system in place. Spill clean-up equipment should be in or near storage area.

Incompatible materials: Strong oxidizers, Strong acids.

Section 8 – Exposure Controls/Personal Protection

Exposure limits:

Chemical Name	ACGIH-TLV	OSHA-PEL
Sodium Metasilicate	Not Available	5mg/m3 (TWA)
Sodium hydroxide	2mg/m3	2mg/m3
Surfactant, blend	Not Available	Not Available

Exposure controls:

Ventilation and Engineering Measures: Use in well ventilated area. Apply technical measures to comply with occupational exposure limits if needed.

Respiratory Measures: If airborne concentrations are above the permissible exposure limit, use NIOSH approved respirators.

Section 8 – Exposure Controls/Personal Protection (Continued)

Skin Protection: Wear protective gloves. Where extensive exposure to the product is possible, use resistant apron/suit and boots.

Eye/Face Protection: Goggles or safety glasses with side shields.

Other Protective Equipment: Ensure that eyewash stations and a safety shower are close to the workstation(s).

General Hygiene Considerations: Avoid prolonged contact with eyes, skin and clothing. Do not eat or drink when using this product. Wash hands after handling. Remove and wash all contaminated clothing before re-use. Handle in accordance with good industrial hygiene and safety practice.

Section 9 – Physical and Chemical Properties

Appearance: Clear light purple liquid.
Odor: Citrus Odor
Odor threshold: Not available
PH: 12.5 -13.8
Melting/Freezing pointing: ~ -3C (26.6F)
Boiling point and boiling range: >100C (212F)
Flash point: >93.3C (199.4F)
Evaporation point (Butyl Acetate=1): Not available.
Flammability (method determination): Not available.
Lower flammability limit (% by vol.): Not available.
Upper flammability limit (% by vol.): Not available.
Vapor pressure: Not available.
Vapor density: Not available.
Relative density: 1.00 – 1.05
Solubility in water: Complete.
Partition Coefficient (n-octanol/water): Not available.
Auto ignition temperature: Not available.
Decomposition temperature: Not available.
Viscosity: Not available.
Volatiles (% by wt) = 0%
Volatile organic compounds: Not available.
Other physical/chemical comments: No addition information.

Section 10 – Stability and Reactivity

Reactivity: Not normally reactive.

Chemical stability: Stable under normal conditions.

Section 10 – Stability and Reactivity (Continued)

Possibility of hazardous reactions: Hazardous polymerization does not occur.

Conditions to avoid: Heat. Contact with incompatible materials.

Incompatible materials: Strong oxidizers, Strong acids. Avoid contact with glass.

Hazardous decomposition products: Carbon oxides.

Section 11 – Toxicological Information

Information on routes of exposure:

Routes of entry - Inhalation: YES
Routes of entry - Skin & Eye: YES
Routes of entry - Ingestion: YES
Routes of entry - Skin Absorption: YES

Potential Health Effects:

Signs and symptoms of short term exposure:

Signs and symptoms: Inhalation – May cause respiratory irritation.

Signs and symptoms: Ingestion – Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Larger amounts may cause burns to the throat and esophagus.

Signs and symptoms: Skin – May cause irritation. Symptoms may include redness, edema, drying, defatting and cracking of the skin.

Signs and symptoms: Eyes – May cause serious irritation.

Potential Chronic Health Effects: None known.

Mutagenicity: Not hazardous by OSHA/WHMIS criteria.

Carcinogenicity: No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects: Not hazardous by OSHA/WHMIS criteria.

Sensitization to material: No data available to indicate product may be a sensitizer.

Specific target organ effects: Not Available.

Section 11 – Toxicological Information (Continued)

Medical conditions aggravated by overexposure: Pre-existing skin and eye conditions.

Toxicological data: The calculated ATE value for this mixture is well above classification parameters.

ATE (oral) = 21,690mg/kg

Chemical Name	LD50-Oral	Dermal
Sodium Metasilicate	847mg/kg (Rat)	Not Available
Sodium hydroxide	500mg/kg (Rabbit)	Not Available
Surfactant, blend	Not Available	Not Available

Section 12 – Ecological Information

Ecotoxicity: This product itself has not been tested.
Mobility is soil: This product itself has not been tested.
Persistence and degradability: This product itself has not been tested.
Bioaccumulation potential: This product itself has not been tested.
Other adverse environmental effects: None Known.

Section 13 – Disposal Information

Handling for disposal: Handle in accordance with good industrial hygiene and safety practice. Refer to protective measures listed in sections 7 and 8.

Methods of disposal: Dispose in accordance with all applicable federal, state, provincial and local regulation. Contact your federal, state, provincial and local authorities for specific rules.

Section 14 – Transportation Information

US 49 CFR/DOT. Ground Transportation

UN No.:	UN3266
UN Proper shipping name:	Corrosive liquid, basic, inorganic, N.O.S., (sodium hydroxide, sodium metasilicate).
Transport hazard class:	8
Packing group:	II
ERG:	154

Special Transportation Notes: May be shipped as Limited Quantity by ground per provisions of CFR 49 173.154 (b).

Section 15 – Regulatory Information

US Federal Information:
TSCA: All listed ingredients appear on the Toxic Substances Control Act.

US CERCLA Reportable quantity (RQ): Sodium hydroxide 1,000 lbs.

SARA Title III: Sec. 302, Extremely Hazardous Substances, 40 CFR 355:
No extremely hazardous substances are present in this material.

SARA Title III: Sec. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes:
Reactive Hazard, Acute Health Hazard, Chronic Health Hazard. Under SARA Section 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SARA Title III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372:
No components are present in this material.

State Regulations:
California Proposition 65: This product does not contain a chemical known to the State of California to cause, birth defects or other reproductive harm.

International Information:
Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

Section 16 – Other Information

HMIS – Hazardous Materials Identification System
Health -2 Flammability -1 Physical Hazard -1 PPE –B

NFPA – National Fire Protection Association
Health -2 Flammability -1 Reactivity -1

Abbreviations legend:

ACGIH: American Conference of Governmental Industrial Hygienist
CAS: Chemical abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
CSA: Canadian Standards Association
DOT: Department of Transportation
ECOTOX: U.S. EPA Ecotoxicology Database
EINECS: European Inventory of Existing Commercial chemical Substances

Section 16 – Other Information (Continued)

EPA: Environmental Protection agency
HSDB: Hazardous Substances database
IARC: International Agency for Research on Cancer
IBC: Intermediate Bulk Container
IUCLID: International Uniform Chemical Information Database
LC: Lethal Concentration
LD: Lethal Dose
NIOSH: National Institute of Occupational Safety and Health
NTP: National Toxicology Program
OECD: Organization for Economic Cooperation and Development
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
SDS: Safety Data Sheet
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

Disclaimer

The information continued herein is based on the manufactures' own study and the work of others, implied, as to the accuracy, completeness or adequacy of the information contained herein, and neither the provider nor the manufacturer (nor the agents, directors, officers, contractors or employees of either) are liable to any party for any damages of any nature, including direct, special or consequential damages arising out of or in connection with the accuracy, completeness, adequacy or furnishing of any information in this SDS, or in any other way related (directly or indirectly) to this SDS. The information provided on this SDS 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 the 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 other process.

Version: 1.0 – Initial Release
Version 2.0 – Corrected Pictogram Information

End of Document

SECTION 1. 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, Marine Gas Oil Dyed.
Product code	:	102762, 102763, 102755, 102302, 102744, 101801, 100678, 100677, 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; Canutec Transportation: 1-888- 226-8832 (toll-free) or 613-996-6666; 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.

GHS Classification

Flammable liquids : Category 3

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Acute toxicity (Inhalation)	:	Category 4
Skin irritation	:	Category 2
Carcinogenicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 2 (Liver, thymus, Bone)
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Harmful if inhaled.
May cause drowsiness or dizziness.
Suspected of causing cancer.
May cause damage to organs (Liver, thymus, Bone) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use non-sparking tools.
Take action to prevent static discharges.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.

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Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

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.

Other hazards

None known.

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

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
fuels, diesel	68334-30-5	70 - 100 %
fuel oil no. 2	68476-30-2	
kerosine (petroleum)	8008-20-6	
kerosine (petroleum), hydrodesulfurized	64742-81-0	
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	
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 : None known.

Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

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SECTION 5. FIREFIGHTING MEASURES

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

SECTION 7. HANDLING AND STORAGE

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

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Keep away from heat and sources of ignition.
Keep container closed when not in use.

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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum)	8008-20-6	TWA	200 mg/m3 (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH
kerosine (petroleum), hydrodesulfurized	64742-81-0	TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH

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.

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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 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. Va-

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		pours 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)
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 COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

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Product:

Acute oral toxicity : Remarks: No data available

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Assessment: The substance or mixture has no acute dermal toxicity
Remarks: No data available

Components:

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

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,

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,

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

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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

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

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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 Regulations

IATA-DGR

UN/ID No.	:	UN 1202
Proper shipping name	:	Diesel fuel
Class	:	3
Packing group	:	III
Labels	:	Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	:	366

IMDG-Code

UN number	:	UN 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

National Regulations

TDG

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

SECTION 15. REGULATORY INFORMATION

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

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

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

SECTION 16. OTHER INFORMATION

For Copy of SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

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

Revision Date : 2017/04/20

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.

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SECTION 1. 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	:	100127, 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; Canutec Transportation: 1-888- 226-8832 (toll-free) or 613-996-6666; 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

GHS Classification

Flammable liquids	:	Category 1
Skin irritation	:	Category 2

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Germ cell mutagenicity	:	Category 1B
Carcinogenicity	:	Category 1A
Reproductive toxicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 1
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Extremely flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
May cause drowsiness or dizziness.
May cause genetic defects.
May cause cancer.
Suspected of damaging the unborn child.
Causes damage to organs () through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
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

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for breathing. Call a POISON CENTER/doctor if you feel unwell.
IF exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry	:	Eye contact 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	:	Causes skin irritation.
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.

Other hazards

None known.

IARC	Group 1: Carcinogenic to humans	
	Benzene	71-43-2
OSHA	OSHA specifically regulated carcinogen	
	Benzene	71-43-2

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NTP	Known to be human carcinogen	
	Benzene	71-43-2

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
gasoline, natural	8006-61-9	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 : None known.

Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

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SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during fire-fighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

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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
gasoline, natural	8006-61-9	TWA	300 ppm 900 mg/m3	OSHA P0
		STEL	500 ppm 1,500 mg/m3	OSHA P0
		TWA	500 ppm 2,000 mg/m3	OSHA Z-1
		STEL	500 ppm 1,500 mg/m3	CAL PEL
		PEL	300 ppm 900 mg/m3	CAL PEL
toluene	108-88-3	TWA	20 ppm	ACGIH
		TWA	100 ppm 375 mg/m3	NIOSH REL
		ST	150 ppm 560 mg/m3	NIOSH REL
		TWA	200 ppm	OSHA Z-2
		CEIL	300 ppm	OSHA Z-2
		Peak	500 ppm (10 minutes)	OSHA Z-2
		TWA	100 ppm 375 mg/m3	OSHA P0
		STEL	150 ppm 560 mg/m3	OSHA P0
		PEL	10 ppm 37 mg/m3	CAL PEL
		C	500 ppm	CAL PEL
		STEL	150 ppm 560 mg/m3	CAL PEL
benzene	71-43-2	TWA	0.5 ppm	ACGIH
		STEL	2.5 ppm	ACGIH
		TWA	0.1 ppm	NIOSH REL
		ST	1 ppm	NIOSH REL
		TWA	10 ppm	OSHA Z-2
		CEIL	25 ppm	OSHA Z-2
		Peak	50 ppm (10 minutes)	OSHA Z-2
		PEL	1 ppm	OSHA CARC
		STEL	5 ppm	OSHA CARC

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		PEL	1 ppm	CAL PEL
		STEL	5 ppm	CAL PEL
ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	NIOSH REL
		TWA	1,000 ppm 1,900 mg/m3	OSHA Z-1
		TWA	1,000 ppm 1,900 mg/m3	OSHA P0
		STEL	1,000 ppm	ACGIH
		PEL	1,000 ppm 1,900 mg/m3	CAL PEL

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sam-pling time	Permissible concentra-tion	Basis
Toluene	108-88-3	Toluene	In blood	Prior to last shift of work-week	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.

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 circum-stances where air-purifying respirators may not provide ade-quate 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,

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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
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)

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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 COx, NOx, 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

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Components:

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

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

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STOT - repeated exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

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

Toxicity to algae : Remarks: No data available

Toxicity to bacteria : Remarks: No data available

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

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

Contaminated packaging : Do not re-use empty containers.

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SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1203
Proper shipping name	:	Gasoline
Class	:	3
Packing group	:	II
Labels	:	Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	:	364

IMDG-Code

UN number	:	UN 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

National Regulations

49 CFR

UN/ID/NA number	:	UN 1203
Proper shipping name	:	Gasoline
Class	:	3
Packing group	:	II
Labels	:	Class 3 - Flammable Liquid
ERG Code	:	128
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

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

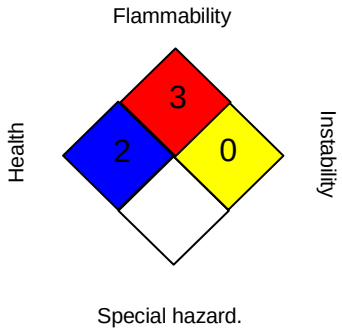
DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

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SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	3*
FLAMMABILITY	3
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

For Copy of SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

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

Revision Date : 2017/04/20

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.

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SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **CAT HYDRAULIC OIL (HYDO) SAE 10W**
Product Description: Base Oil and Additives
Product Code: 20202050B020, 478909-00, 971670
Intended Use: Hydraulic/transmission fluid

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300 or 703-527-3887 CHEMTREC
Product Technical Information	800-662-4525
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1900.1200.

PHYSICAL / CHEMICAL HAZARDS
No significant hazards.

HEALTH HAZARDS
High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS
No significant hazards.

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

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert

advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
ZINC DITHIOPHOSPHATE	68649-42-3	1 - 2.5%	H315, H318, H401, H411

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4 FIRST AID MEASURES

INHALATION

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

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

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters 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.

Unusual Fire Hazards: Pressurized mists may form a flammable mixture.

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

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

Water Spill: Stop leak if you can do it 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: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

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

No biological limits allocated.

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. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
No protection is ordinarily required under normal conditions of use.

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

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

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

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.878
Flammability (Solid, Gas): N/A
Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: > 316°C (600°F) [Estimated]
Decomposition Temperature: N/D
Vapor Density (Air = 1): > 2 at 101 kPa [Estimated]

Vapor Pressure: < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
Solubility in Water: Negligible
Viscosity: 37.7 cSt (37.7 mm2/sec) at 40 °C | 6.1 cSt (6.1 mm2/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -18°C (0°F)
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

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.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitization	
Respiratory Sensitization: No end point data	Not expected to be a respiratory sensitizer.

for material.	
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

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.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

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

ECOTOXICITY

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

MOBILITY

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

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

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

SECTION 13 DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

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

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

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

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ZINC DITHIOPHOSPHATE	68649-42-3	1 - 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	13, 15, 17, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0 PPEC: A

DGN: 2004671XUS (546411)

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	TWO CYCLE MOTOR OIL
Product code	:	TWOCYCDRM, TWOCYCC12, TWOCYC, TWOCYCBLK
Manufacturer or supplier's details		Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga ON L5J 1K2 Canada Petro-Canada America Lubricants Inc. 115N Oak Park Avenue #1C Oak Park IL 60301-1366 United States
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	:	A low ash 2-cycle engine oil designed to lubricate conventional pre-mixed fuel/oil as well as oil injection lubricated engines powering air-cooled two-stroke cycle engines.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	viscous liquid
Colour	Blue-green.
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 equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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

Pure 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 eyes or 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

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circumstances and the surrounding environment.

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, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), phosphorus oxides (POx), hydrocarbons, aldehydes, smoke and irritating vapours as products of incomplete combustion.
Specific extinguishing methods	:	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. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Do not ingest. Keep away from heat and sources of ignition. Keep container closed when not in use.
Conditions for safe storage	:	Store in original container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in a dry, cool and well-ventilated place. Keep in properly labelled containers. To maintain product quality, do not store in heat or direct sunlight.

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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.
Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.

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.
Recommended Filter type:

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 if splashing hazard is likely.

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 hands and face before breaks and immediately after handling the product.
Wash contaminated clothing before re-use.
Ensure that eyewash station and safety shower are proximal to the work-station location.

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 : Blue-green.

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Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	-48 °C (-54 °F)
Boiling point/boiling range	:	No data available
Flash point	:	149 °C (300 °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
Density	:	0.8508 kg/l (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	37.1 cSt (40 °C / 104 °F)
		7.03 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.
		No dangerous reaction known under conditions of normal use.
Conditions to avoid	:	No data available
Incompatible materials	:	Reactive with oxidising agents, reducing agents, and acids.

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Hazardous decomposition	:	May release COx, NOx, SOx, aldehydes, methacrylate

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products	monomers, hydrocarbons, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

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:

Result: Mild skin irritation

Serious eye damage/eye irritation

Product:

Result: Mild 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

STOT - repeated exposure

No data available

Aspiration toxicity

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

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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

No data available

Bioaccumulative potential

Product:

Partition coefficient: n-octanol/water	:	Remarks: No data available

Mobility in soil

No data available

Other adverse effects

No data available

Product:

Additional ecological information	:	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

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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

Not applicable

SECTION 15. REGULATORY INFORMATION

OSHA Hazards	:	This material is non-hazardous as defined by the American OSHA Hazard Communication Standard.
WHMIS Classification	:	Not Rated

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

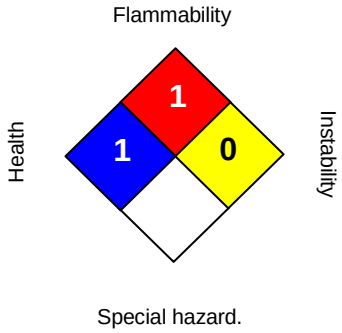
DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
ELINCS	At least one component is not listed in EINECS but all such components are listed in ELINCS.
IECSC	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

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Further information

NFPA:



HMIS III:

HEALTH	1
FLAMMABILITY	1
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

For Copy of (M)SDS : The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:
Internet: lubricants.petro-canada.ca/msds
Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518
Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285
United States, telephone: 1-800-268-5850; 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.

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Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Delo 400 LE Synthetic SAE 5W-40

Product Use: Diesel Engine Oil
Product Number(s): 271207
Company Identification
Chevron Canada Limited
1050 West Pender
Vancouver, BC V6E 3T4
Canada
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: (800) LUBE TEK

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Not classified as hazardous according to Canada regulatory guidelines.

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

-

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	60 - 65 %weight
Zinc dialkyldithiophosphate	68649-42-3	0.1 - < 2.5 %weight
Phenol, dodecyl-, branched	121158-58-5	0.1 - < 1.5 %weight

Information on ingredients that are considered Controlled Products and/or that appear on the WHMIS Ingredient Disclosure List (IDL) is provided as required by the Canadian Hazardous Products Act (HPA, Sections 13 and 14). Ingredients considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, are also listed. See Section 15 for additional regulatory information.

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.

Skin: To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.

Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.

Ingestion: Not expected to be harmful if swallowed.

Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

Indication of any immediate medical attention and special treatment needed Not Applicable

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: Keep out of the reach of children.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, 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. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.
Respiratory Protection: No respiratory protection is normally required.
If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--

NOTE ON OCCUPATIONAL EXPOSURE LIMITS: Consult local authorities for acceptable provincial values in Canada. Consult the Canadian Standards Association Standard 94.4-2002 Selection, Use and Care of Respirators.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Amber
Physical State: Liquid

Odor: Petroleum odor
Odor Threshold: No data available
pH: No data available
Vapor Pressure: <0.01 mmHg Maximum @ 37.8 °C (100 °F)
Vapor Density (Air = 1): >1 Minimum
Initial Boiling Point: No data available
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable
Melting Point: No data available
Density: 0.8590 kg/l @ 15°C (59°F) (Typical)
Viscosity: 14 mm2/s @ 100°C (212°F) Minimum
Coefficient of Therm. Expansion / °F: No data available
Evaporation Rate: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:

Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 200 °C (392 °F) Minimum
Autoignition: No data available

Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.
Sensitivity to Mechanical Impact: No.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for product components.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for product components.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:
During use in engines, contamination of oil with low levels of cancer-causing combustion products occurs. Used motor oils have been shown to cause skin cancer in mice following repeated application and continuous exposure. Brief or intermittent skin contact with used motor oil is not expected to have serious effects in humans if the oil is thoroughly removed by washing with soap and water.
This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).
These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.
The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is not expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material.
The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods. (See B.C. Reg. GY/92 Waste Management Act; R.R.O. 1990, Reg. 347 General-Waste Management; C.C.SM.c. W40 The Waste Reduction and Prevention Act; N.S. Reg. 51/95 and N.S. Reg. 179/96 for examples of Provincial legislation.)

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

TC Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER TRANSPORT CANADA (TDG)

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO

DOT Shipping Description: NOT REGULATED AS A HAZARDOUS MATERIAL UNDER 49 CFR

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:

1-1 =IARC Group 1	03=EPCRA 313
1-2 A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), KECI (Korea), PICCS (Philippines), TSCA (United States).

One or more components is listed on ELINCS (European Union). Secondary notification by the importer may be required. All other components are listed or exempted from listing on EINECS.

One or more components does not comply with the following chemical inventory requirements: ENCS (Japan), IECSC (China).

SECTION 16 OTHER INFORMATION

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 1-16
Revision Date: OCTOBER 07, 2015

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Supreme Motor Oil SAE 30, 40, 10W-40, 20W-50

Product Use: Automotive Engine Oil
Product Number(s): 220002, 220011, 220059, 220060
Company Identification
Chevron Canada Limited
1050 West Pender
Vancouver, BC V6E 3T4
Canada
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: (800) LUBE TEK

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Not classified as hazardous according to Canada regulatory guidelines.

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	70 - 99 %weight

Information on ingredients that are considered Controlled Products and/or that appear on the WHMIS

Ingredient Disclosure List (IDL) is provided as required by the Canadian Hazardous Products Act (HPA, Sections 13 and 14). Ingredients considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, are also listed. See Section 15 for additional regulatory information.

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: No specific first aid measures are required. As a precaution, remove clothing and shoes if contaminated. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: No specific first aid measures are required. Do not induce vomiting. As a precaution, get medical advice.
Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Contact with the skin is not expected to cause prolonged or significant irritation. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.
Ingestion: Not expected to be harmful if swallowed.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

Indication of any immediate medical attention and special treatment needed Not Applicable

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: This material will burn although it is not easily ignited. See Section 7 for proper handling and storage. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in vicinity of spilled material.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Precautionary Measures: Keep out of the reach of children.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, 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. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: No special protective clothing is normally required. Where splashing is possible, select protective clothing depending on operations conducted, physical requirements and other substances in the workplace. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.

Respiratory Protection: No respiratory protection is normally required.
If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--

No applicable occupational exposure limits exist for this material or its components. NOTE ON OCCUPATIONAL EXPOSURE LIMITS: Consult local authorities for acceptable provincial values in Canada. Consult the Canadian Standards Association Standard 94.4-2002 Selection, Use and Care of Respirators.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Amber
Physical State: Liquid
Odor: Petroleum odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: <0.01 mmHg @ 100 °C (212 °F)
Vapor Density (Air = 1): >1
Initial Boiling Point: 315°C (599°F)
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable @ 15.6°C (60.1°F) / 15.6°C (60.1°F)
Density: 0.8732 kg/l @ 15°C (59°F) Minimum
Viscosity: 9.9 mm2/s @ 100°C (212°F) (Min)
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 205 °C (401 °F) (Min)
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.
Sensitivity to Mechanical Impact: No.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for product components.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for product components.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:
During use in engines, contamination of oil with low levels of cancer-causing combustion products occurs. Used motor oils have been shown to cause skin cancer in mice following repeated application and continuous exposure. Brief or intermittent skin contact with used motor oil is not expected to have serious effects in humans if the oil is thoroughly removed by washing with soap and water.
This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).
These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is not expected to be harmful to aquatic organisms.
The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is not expected to be readily biodegradable. The biodegradability of this material is based on an evaluation of data for the components or a similar material.
The product has not been tested. The statement has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods. (See B.C. Reg. GY/92 Waste Management Act; R.R.O. 1990, Reg. 347 General-Waste Management; C.C.SM.c. W40 The Waste Reduction and Prevention Act; N.S. Reg. 51/95 and N.S. Reg. 179/96 for examples of Provincial legislation.)

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

TC Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER TDG REGULATIONS

IMO/IMDG Shipping Description: PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER THE IMDG CODE

ICAO/IATA Shipping Description: PETROLEUM LUBRICATING OIL; NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORT UNDER ICAO TI OR IATA DGR

DOT Shipping Description: PETROLEUM LUBRICATING OIL, NOT REGULATED AS A HAZARDOUS MATERIAL FOR TRANSPORTATION UNDER 49 CFR

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:

1-1 =IARC Group 1	03=EPCRA 313
1-2 A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), KECI (Korea), PICCS (Philippines), TSCA (United States).

One or more components has been notified but may not be listed in the following chemical inventories: IECSC (China). Secondary notification may be required.

One or more components is listed on ELINCS (European Union). Secondary notification by the importer may be required. All other components are listed or exempted from listing on EINECS.

One or more components does not comply with the following chemical inventory requirements: ENCS (Japan).

SECTION 16 OTHER INFORMATION

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 1-16.
Revision Date: SEPTEMBER 10, 2015

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
HMIS - Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

The above information is based on the data of which we are aware and is believed to be correct

as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

DURON TM/MC -E 15W-40

000003000916

SECTION 1. IDENTIFICATION

Product name	:	DURON TM/MC -E 15W-40
Product code	:	DE15CBE, DE15P5R, DE15P20, DE15ICT, DE15IBC, DE15DRR, DE15DRM, DE15DCT, DE15C16, DE15C12, DE15C02, DE15, DE15BLK
Manufacturer or supplier's details		Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga ON L5J 1K2 Canada
Emergency telephone number		Petro-Canada Lubricants Inc.: +1 905-403-5770; CHEMTREC Transport Emergency: 1-800-424-9300; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	DURON-E 15W-40 is a superior quality heavy duty diesel engine oil specifically designed for '07 EPA engine requirements along with improved performance benefits in legacy engines. Application includes modern low emission diesel engines with cooled exhaust gas recirculation and exhaust after treatment technology. It is suitable also for passenger car and light truck diesel engines, and spark ignition engines.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	Light amber.
Odour	Mild petroleum oil like.

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion

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Inhalation
Skin contact

Aggravated Medical Condition : None known.

Other hazards

None known.

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
White mineral oil (petroleum)	8042-47-5	30 - 50 %
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	30 - 50 %
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based	72623-87-1	30 - 50 %
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity	72623-85-9	30 - 50 %
Zinc alkyldithiophosphate	113706-15-3	1 - 5 %

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 eyes or 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.

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Obtain medical attention.

If swallowed	:	Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	:	First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	No information available.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), phosphorus oxides (POx), sulphur compounds (H2S), zinc oxides (ZnOx), metal oxides, hydrocarbons, smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

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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. 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
White mineral oil (petroleum)	8042-47-5	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based	72623-87-1	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity	72623-85-9	TWA (Mist)	5 mg/m3	CA AB OEL

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		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH

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 according to the amount and concentration of the dangerous substance at the work place.

Protective measures : Wash hands and face before breaks and immediately after handling the product.
Wash contaminated clothing before re-use.
Ensure that eyewash station and safety shower are proximal to the work-station location.

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : viscous liquid

Colour : Light amber.

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Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	-36 °C (-33 °F)
Boiling point/boiling range	:	No data available
Flash point	:	228 °C (442 °F) Method: Cleveland open cup
Fire Point	:	247 °C (477 °F)
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
Relative density	:	No data available
Density	:	0.8711 kg/l (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	118.2 cSt (40 °C / 104 °F)
		15.6 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

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Incompatible materials	:	Reactive with oxidizing agents and water.
Hazardous decomposition products	:	May release COx, H2S, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	Remarks: No data available
Acute dermal toxicity	:	Assessment: The substance or mixture has no acute dermal toxicity

Components:

White mineral oil (petroleum):

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

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lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity:

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

Acute inhalation toxicity : LC50 (Rat): > 5.2 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

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

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 product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

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.

National Regulations

TDG

Not regulated as a dangerous good

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SECTION 15. REGULATORY INFORMATION

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.
ELINCS	At least one component is not listed in EINECS but all such components are listed in ELINCS.

SECTION 16. OTHER INFORMATION

For Copy of SDS : Internet: lubricants.petro-canada.com/sds
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

Revision Date : 2017/03/24

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.

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
NULON 85W-140 LIMITED SLIP DIFFERENTIAL OIL

SYNONYMS
"Product Code: LSD85W140"

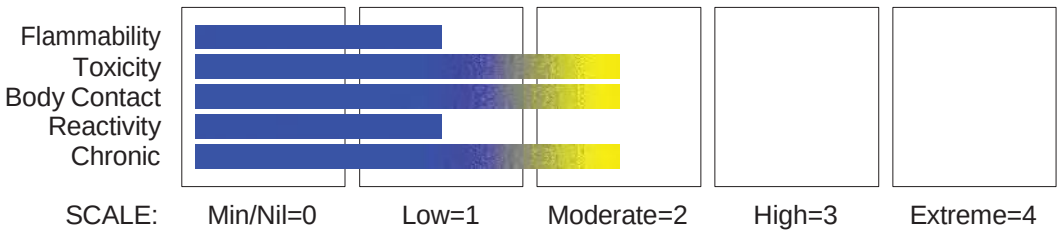
PRODUCT USE
• Used according to manufacturer's directions.
Limited slip differential oil.

SUPPLIER
Company: Nulon Products Pty Ltd
Address:
17 Yulong Close
Moorebank
NSW, 2170
Australia
Telephone: +61 2 9608 7800
Fax: +61 2 9601 4700
Email: msds@nulon.com.au

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE
NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

CHEMWATCH HAZARD RATINGS



POISONS SCHEDULE
None

RISK
•None under normal operating conditions.

SAFETY

Safety Codes	Safety Phrases
S23	• Do not breathe gas/fumes/vapour/spray.
S24	• Avoid contact with skin.
S39	• Wear eye/face protection.
S26	• In case of contact with eyes rinse with plenty of water and contact Doctor or Poisons Information Centre.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
residual oils, petroleum, solvent- refined (severe)	64742-01-4.	80-85
paraffinic distillate, heavy, hydrotreated (severe)	64742-54-7.	5-10
mineral oil	Not avail.	5-15
ingredients at levels determined not to be hazardous		balance

continued...

Section 4 - FIRST AID MEASURES

SWALLOWED
• - Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

EYE
• If this product comes in contact with the eyes:
- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
• If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED
• - If fumes or combustion products are inhaled remove from contaminated area.
- Other measures are usually unnecessary.

NOTES TO PHYSICIAN
• Treat symptomatically.
- Heavy and persistent skin contamination over many years may lead to dysplastic changes. Pre-existing skin disorders may be aggravated by exposure to this product.
- In general, emesis induction is unnecessary with high viscosity, low volatility products, i.e. most oils and greases.
- High pressure accidental injection through the skin should be assessed for possible incision, irrigation and/or debridement.
NOTE: Injuries may not seem serious at first, but within a few hours tissue may become swollen, discoloured and extremely painful with extensive subcutaneous necrosis.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
• - Water spray or fog.
- Alcohol stable foam.
- Dry chemical powder.
- Carbon dioxide.

FIRE FIGHTING
• - Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.

FIRE/EXPLOSION HAZARD
• - Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
Combustion products include: carbon dioxide (CO_2), phosphorus oxides (POx), sulfur oxides (SOx), other pyrolysis products typical of burning organic material.
May emit poisonous fumes.
CARE: Water in contact with hot liquid may cause foaming and a steam explosion with wide scattering of hot oil and possible severe burns. Foaming may cause overflow of containers and may result in possible fire.

FIRE INCOMPATIBILITY
• - Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

HAZCHEM
None

PERSONAL PROTECTION

Glasses:	Gloves:	Respirator:
Chemical goggles.	PVC chemical resistant type.	Type A- P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
• Slippery when spilt.
- Remove all ignition sources.
- Clean up all spills immediately.

continued...

- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.

MAJOR SPILLS
• Slippery when spilt.
Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
• - DO NOT allow clothing wet with material to stay in contact with skin.
- Electrostatic discharge may be generated during pumping - this may result in fire.
- Ensure electrical continuity by bonding and grounding (earthing) all equipment.
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec).
- Avoid splash filling.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

SUITABLE CONTAINER
• - Metal can or drum
- Packaging as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY
• CARE: Water in contact with heated material may cause foaming or a steam explosion with possible severe burns from wide scattering of hot material. Resultant overflow of containers may result in fire.
- Avoid reaction with oxidising agents.

STORAGE REQUIREMENTS
• - Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m3
Australia Exposure Standards	residual oils, petroleum, solvent-refined (severe) (Oil mist, refined mineral)	5
Australia Exposure Standards	paraffinic distillate, heavy, hydrotreated (severe) (Oil mist, refined mineral)	5
Australia Exposure Standards	mineral oil (Oil mist, refined mineral)	5

PERSONAL PROTECTION

RESPIRATOR
Type A-P Filter of sufficient capacity

EYE
• - Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

continued...

HANDS/FEET
• - Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.
NOTE:
- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity.

OTHER
• - Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.

ENGINEERING CONTROLS
• General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
Clear bright amber liquid; not miscible with water.

PHYSICAL PROPERTIES
Liquid.
Does not mix with water.
Floats on water.

State	Liquid	Molecular Weight	Not Available
Melting Range (℃)	Not Available	Viscosity	384 cSt@40℃
Boiling Range (℃)	Not Available	Solubility in water (g/L)	Immiscible
Flash Point (℃)	180 (PMCC)	pH (1% solution)	Not Applicable
Decomposition Temp (℃)	Not Available	pH (as supplied)	Not Applicable
Autoignition Temp (℃)	Not Available	Vapour Pressure (kPa)	Not Available
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	0.88- 0.93
Lower Explosive Limit (%)	Not Available	Relative Vapour Density (air=1)	Not Available
Volatile Component (%vol)	Not Available	Evaporation Rate	Not Available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY
• - Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.
For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS
ACUTE HEALTH EFFECTS
• Not applicable.

CHRONIC HEALTH EFFECTS
• Not applicable.

TOXICITY AND IRRITATION
PARAFFINIC DISTILLATE, HEAVY, HYDROTREATED (SEVERE):
MINERAL OIL:
RESIDUAL OILS, PETROLEUM, SOLVENT-REFINED (SEVERE):
• unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

• unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

• Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.
No significant acute toxicological data identified in literature search.

RESIDUAL OILS, PETROLEUM, SOLVENT-REFINED (SEVERE):

continued...

• No significant acute toxicological data identified in literature search.
The substance is classified by IARC as Group 3:
NOT classifiable as to its carcinogenicity to humans.
Evidence of carcinogenicity may be inadequate or limited in animal testing.

PARAFFINIC DISTILLATE, HEAVY, HYDROTREATED (SEVERE):

TOXICITY
Oral (rat) LD50: >15000 mg/kg
Dermal (None) rabbit: None >5000 mg/kg
• No data of toxicological significance identified in literature search.

IRRITATION
Nil Reported

MINERAL OIL:

• Toxicity and Irritation data for petroleum-based mineral oils are related to chemical components and vary as does the composition and source of the original crude.
A small but definite risk of occupational skin cancer occurs in workers exposed to persistent skin contamination by oils over a period of years.
Petroleum oils which are solvent refined/extracted or severely hydrotreated, contain very low concentrations of both.

Section 12 - ECOLOGICAL INFORMATION

No data

Section 13 - DISPOSAL CONSIDERATIONS

• - Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.
Otherwise:
- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area.
A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction.
- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM:
None (ADG7)

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: ADG7, UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE
None

REGULATIONS
Regulations for ingredients

residual oils, petroleum, solvent-refined (severe) (CAS: 64742-01-4) is found on the following regulatory lists;
"Australia Hazardous Substances","Australia Inventory of Chemical Substances (AICS)","OECD Representative List of High Production Volume (HPV) Chemicals"

continued...

paraffinic distillate, heavy, hydrotreated (severe) (CAS: 64742-54-7) is found on the following regulatory lists;
"Australia Hazardous Substances","Australia High Volume Industrial Chemical List (HVICL)","Australia Inventory of Chemical Substances (AICS)","OECD Representative List of High Production Volume (HPV) Chemicals"

No data for Nulon 85W-140 Limited Slip Differential Oil (CW: 4731-28)
No data for mineral oil (CAS: , Not avail)

Section 16 - OTHER INFORMATION

• Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

• The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

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Issue Date: 24-Aug-2010
Print Date: 25-Aug-2010

This is the end of the MSDS.

continued...

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Cover Sheet

micromeritics®
INSTRUMENT CORPORATION
ONE MICROMERITICS DR.
NORCROSS, GA 30093-1877 U.S.A.

REV	REVISION DESCRIPTION	BY	DATE	CHK	REL. NO.		
						DWN BY	J. Pittman
						ENGR	J. Mocny
C	Revision	JAP	6/25/04		040265	ENGR SIG	P. Hendrix
B	Revision	MD	04/02/03	JM	030200	HR SIG	J. Mocny
A	New format and numbering system	C. Bills	5/24/00	—	990544	QA SIG	A. Dovin
-	Formal Release	C. Bills	6-26-07	—	970446	ES SIG	K. Massengill

MSDS
HYDRAULIC FLUID OD-15-10
(1-L)

SIZE	NUMBER	PAGE
A	920/16002/00MSDS	X of 3

Micromeritics Material Safety Data Sheet

Title : HYDRAULIC FLUID OD-15-10(1-L)
Date of Preparation : 06/25/04

MSDS No. : 920/16002/00MSDS
Revision : C

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: HYDRAULIC FLUID OD-15-10
Chemical Formula: Blend
CAS Number: n/a
Other Designations:
General Use:
Supplier: Micromeritics Instrument Corp.
1 Micromeritics Dr.
Norcross, GA 30093-1877 USA
Contact: Human Resources
Phone: (770) 662-3620
Fax: (770) 662-3696
Manufacturer: Sun Company, Inc. Ten Penn Center 1801 Market St. Philadelphia, PA 19103-1699
(770) 662-3678

Section 2 - Composition I Information on Ingredients

Ingredient Name	CAS Number	% vol
Severely solvent refined heavy paraffinic petroleum oil	64741-88-4	90-100
Zinc dialkyl Dithiophosphats	68649-42-3	0-1
Butylated Phenol	n/a	0-1
Calcium Sulfonate	61789-86-4	0-1
Acrylic Copolymer	68171-46-0	0-1
2-Ethylhexanol	104-76-7	0-1

Trace Impurities:

	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH
Ingredient	**TWA**	**STEL**	**TWA**	**STEL**	**TWA**	**STEL**	**IDLH**
Severely solvent refined heavy paraffinic petroleum oil	5mg/m^3		5mg/m^3		n/a	n/a	n/a
Zinc dialkyl Dithiophosphats	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Butylated Phenol	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Calcium Sulfonate	n.a	n/a	n/a	n/a	n/a	n/a	n/a
Acrylic Copolymer	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-Ethylhexanol	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Additional exposure limits: Oil Mist	5mg/m^3		5mg/m^3				

Section 3 - Hazards Identification

Emergency vervie

HMIS
H 1
F 1
R 0
PPE†
†Sec. 8

Potential Health Effects

Primary Entry Routes: Skin
Effects of Overexposure:

Inhalation: No effects expected
Eye: Contact with the eye may cause minimal irritation.
Skin: Practically non-toxic if absorbed (LD50 greater than 2000 mg/kg). May cause mild irritation with prolonged or repeated contact.
Ingestion: Practically non-toxic (LD50 > 15g/Kg).

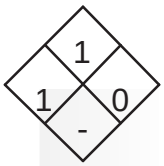
Section 4 - First Aid Measures

Inhalation: Move person to fresh air.
Eye: Flush with water.
Skin: Wash with soap and water until no odor remains. Wash clothing before reuse.
Swallowing: Practically non-toxic. Induction of vomiting not required. Obtain emergency medical attention. Small amounts which accidentally enter mouth should be rinsed out until taste of it is gone.

Other Information: Warning!! *High pressure in}ection of oil through the skin is a medial emergency. There may be no sign of in}ury and no initial pain. This oil must be removed completely by a physician. Failure to obtain immediate treatment has resulted in loss of a finger, hand or arm.*
WHMIS Classification: Not controlled.

Section 5 - Fire-Fighting Measures

NFPA



Flash Point: 380°F (192°C)
Flash Point Method: COC
Extinguishing Media: Water spray, regular foam, dry chemical, carbon dioxide.
Unusual Fire or Explosion Hazards: n/a
Fire-Fighting Procedures: Wear self-contained breathing apparatus. Wear structural firefighters protective clothing.

Section 6 - Accidental Release Measures

Spill /Leak Procedures: n/a

Section 7 - Handling and Storage

Handling/ Storage Requirements: n/a

Section 8 - Exposure Controls I Personal Protection

N/A

Section 9 - Physical and Chemical Properties

Appearance and Odor: clear fluid, little odor
Odor Threshold: n/a
Vapor Pressure: <0.0001 (mm Hg at 20 °C)
Vapor Density (Air=1): 10 +
Formula Weight: n/a
Density: n/a
Specific Gravity (H_2O=1, at 4 °C): 0.87
Water Solubility: nil
Other Solubilities: n/a
Boiling Point: n/a
Melting Point: n/a
Viscosity: 165 sus @ 100°F. 32.0 CST @ 40 °C.
% Volatile: n/a
Evaporation Rate: 1000X slower (ehtyl ether = 1)

Section 10 - Stability and Reactivity

Stability: HYDRAULIC FLUID OD-15-10 is stable.
Polymerization: Hazardous polymerization will not occur.
Chemical Incompatibilities: Strong oxidizers.
Conditions to Avoid: n/a
Hazardous Decomposition Products: Combustion will produce carbon monoxide, oxides of sulfur and asphyxiants.

Section 11- Toxicological Information

n/a

Section 12 - Ecological Information

Ecotoxicity: n/a

Section 13 - Disposal Considerations

Disposal: n/a

Section 14 - Transport Information

n/a

Section 15 - Regulatory Information

n/a

Section 16 - ther Information

Prepared By: C. Bills
Revision Notes:

Disclaimer:

SAFETY DATA SHEET

DEXRON GEAR OIL 75W-90

000003000195

Version 7.1 Revision Date 2017/01/27 Print Date 2017/02/01

SECTION 1. IDENTIFICATION

Product name : DEXRON GEAR OIL 75W-90

Product code : DEX75IBC, DEX75DRM, DEX75, DEX75BLK

Manufacturer or supplier's details

Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga ON L5J 1K2
Canada

Emergency telephone number

Petro-Canada Lubricants Inc.: +1 905-403-5770;
CHEMTREC Transport Emergency: 1-800-424-9300;
Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use : A rear axle and differential lubricant for light duty vehicles. Meets General Motors specification 9986285.

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

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	dark yellow
Odour	Mild petroleum oil like or no odour.

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Aggravated Medical Condition : None known.

Other hazards

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None known.

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
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	30 - 50 %
1-Decene, homopolymer, hydrogenated	68037-01-4	30 - 50 %
Methacrylate copolymers		1 - 5 %
Petroleum oil		1 - 5 %
Alkyl phosphate		1 - 5 %
Long-chain alkyl amine with substituted heteromonocyclic		1 - 5 %
Long-chain alkyl amine		0.1 - 1 %

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.

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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.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Do not ingest.

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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
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH

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

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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	:	viscous liquid
Colour	:	dark yellow
Odour	:	Mild petroleum oil like or no odour.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	< -57 °C (< -71 °F)
Boiling point/boiling range	:	No data available
Flash point	:	187 °C (369 °F) Method: Cleveland open cup
Fire Point	:	225 °C (437 °F)
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	:	0.8567 kg/l (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		

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Viscosity, kinematic	:	88.5 cSt (40 °C / 104 °F)
		15.2 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, acids, alkalis and reducing agents.
Hazardous decomposition products	:	May release COx, POx, SOx, NOx, 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:

lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

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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

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

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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 product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

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.

National Regulations

TDG

Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

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 This product contains one or several components that are not on the Canadian DSL nor NDSL lists.

TSCA All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.

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SECTION 16. OTHER INFORMATION

For Copy of SDS	:	Internet: lubricants.petro-canada.com/sds 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
Revision Date	:	2017/01/27

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.

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Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet
Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CI#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target

organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammble gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrodgen gas.

Special Remarks on Explosion Hazards:

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4 , Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m3) from OSHA (PEL) [United States] CEIL: 5 from NIOSH CEIL: 7 (mg/m3) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:
108.58 C @ 760 mm Hg (for 20.22% HCl in water) 83 C @ 760 mm Hg (for 31% HCl in water) 50.5 C (for 37% HCl in water)

Melting Point:
-62.25°C (-80°F) (20.69% HCl in water) -46.2 C (31.24% HCl in water) -25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:
1.1- 1.19 (Water = 1) 1.10 (20%and 22% HCl solutions) 1.12 (24% HCl solution) 1.15 (29.57% HCl solution) 1.16 (32% HCl solution) 1.19 (37% and 38%HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Soluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:
Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water.

Corrosivity:
Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphide and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothmeric reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the folloiwng can cause explosion or ignition on contact or

Special Remarks on Corrosivity:

Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinium, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (fetoxicity). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjuntivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and larryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomitting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophogeal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Hydrochloric acid Illinois toxic substances disclosure to employee act: Hydrochloric acid Illinois chemical safety act: Hydrochloric acid New York release reporting list: Hydrochloric acid Rhode Island RTK hazardous substances: Hydrochloric acid Pennsylvania RTK: Hydrochloric acid Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid Massachusetts spill list: Hydrochloric acid New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid Louisiana RTK reporting list: Hydrochloric acid Louisiana spill reporting: Hydrochloric acid California Director's List of Hazardous Substances: Hydrochloric acid TSCA 8(b) inventory: Hydrochloric acid TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R34- Causes burns. R37- Irritating to respiratory system. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

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

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

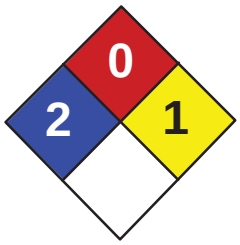
References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 05:45 PM

Last Updated: 11/01/2010 12:00 PM

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Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet
Hydrogen Peroxide 30% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrogen Peroxide 30%

Catalog Codes: SLH1552

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Water; Hydrogen Peroxide

CI#: Not applicable.

Synonym: Hydrogen Peroxide 30%

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Water	7732-18-5	70
Hydrogen Peroxide	7722-84-1	30

Toxicological Data on Ingredients: Hydrogen Peroxide: ORAL (LD50): Acute: 2000 mg/kg [Mouse]. DERMAL (LD50): Acute: 4060 mg/kg [Rat]. 2000 mg/kg [pig]. VAPOR (LC50): Acute: 2000 mg/m 4 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (corrosive), of eye contact (corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: combustible materials

Explosion Hazards in Presence of Various Substances: Slightly explosive in presence of open flames and sparks, of heat, of organic materials, of metals, of acids.

Fire Fighting Media and Instructions:
Fire: Small fires: Use water. Do not use dry chemicals or foams. CO2, or Halon may provide limited control. Large fires: Flood fire area with water from a distance. Move containers from fire area if you can do it without risk. Do not move cargo or vehicle if cargo has been exposed to heat. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. / Hydrogen peroxide, aqueous solution, with not less than 8% but less than 20% Hydrogen peroxide; Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000,p. G-140]

Special Remarks on Fire Hazards:
Most cellulose (wood, cotton) materials contain enough catalyst to cause spontaneous ignition with 90% Hydrogen Peroxide. Hydrogen Peroxide is a strong oxider. It is not flammable itself, but it can cause spontaneous combustion of flammable materials and continued support of the combustion because it liberates oxygen as it decomposes. Hydrogen peroxide mixed with magnesium and a trace of magnesium dioxide will ignite immediately.

Special Remarks on Explosion Hazards:

Soluble fuels (acetone, ethanol, glycerol) will detonate on a mixture with peroxide over 30% concentration, the violence increasing with concentration. Explosive with acetic acid, acetic anhydride, acetone, alcohols, carboxylic acids, nitrogen containing bases, As2S3, Cl2 + KOH, FeS, FeSO4 + 2 methylpryidine + H2SO4, nitric acid, potassium permanganate, P2O5, H2Se, Alcohols + H2SO4, Alcohols + tin chloride, Antimoy trisulfide, chlorosulfonic acid, Aromatic hydrocarbons + trifluoroacetic acid, Azeliac acid + sulfuric acid (above 45 C), Benzenesulfonic anhydride, tert-butanol + sulfuric acid, Hydrazine, Sulfuric acid, Sodium iodate, Tetrahydrothiophene, Thiodiglycol, Mercurous oxide, mercuric oxide, Lead dioxide, Lead oxide, Manganese dioxide, Lead sulfide, Gallium + HCl, Ketenes + nitric acid, Iron (II) sulfate + 2-methylpyridine + sulfuric acid, Iron (II) sulfate + nitric acid, + sodium carboxymethylcellulose (when evaporated), Vinyl acetate, trioxane, water + oxygenated compounds (eg: acetaldehyde, acetic acid, acetone, ethanol, formaldehyde, formic acid, methanol, 2-propanol, propionaldehyde), organic compounds. Beware: Many mixitures of hydrogen peroxide and organic materials may not explode upon contact. However, the resulting combination is detonatable either upon catching fire or by impact. EXPLOSION HAZARD: SEVERE, WHEN HIGHLY CONCENTRATED OR PURE H2O2 IS EXPOSED TO HEAT, MECHANICAL IMPACT, OR CAUSED TO DECOMPOSE CATALYTICALLY BY METALS & THEIR SALTS, DUSTS & ALKALIES. ANOTHER SOURCE OF HYDROGEN PEROXIDE EXPLOSIONS IS FROM SEALING THE MATERIAL IN STRONG CONTAINERS. UNDER SUCH CONDITIONS EVEN GRADUAL DECOMPOSITION OF HYDROGEN PEROXIDE TO WATER + 1/2 OXYGEN CAN CAUSE LARGE PRESSURES TO BUILD UP IN THE CONTAINERS WHICH MAY BURST EXPLOSIVELY. Fire or explosion: May explode from friction, heat or contamination. These substances will accelerate burning when involved in a fire. May ignite combustibles (wood, paper, oil, clothing, etc.). Some will react explosively with hydrocarbons (fuels). Containers may explode when heated. Runoff may create fire or explosion hazard. /Hydrogen peroxide, aqueous solution, stabilized, with more than 60% Hydrogen peroxide; Hydrogen peroxide, stabilized/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000,p. G-143] . Fire or explosion: These substances will accelerate burning when involved in a fire. Some may decompose explosively when heated or involved in a fire. May explode from heat or contamination. Some will react explosively with hydrocarbons (fuels). May ignite combustibles (wood, paper, oil, clothing, etc.). Containers may explode when heated. Runoff may create fire or explosion hazard. /Hydrogen peroxide, aqueous solution, with not less than 8% but less than 20% Hydrogen peroxide; Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000,p. G-140] (Hydrogen Peroxide)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Corrosive liquid. Oxidizing material. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from combustible material.. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis.

Storage:
Keep container tightly closed. Keep container in a cool, well-ventilated area. Separate from acids, alkalies, reducing agents and combustibles. See NFPA 43A, Code for the Storage of Liquid and Solid Oxidizers. Do not store above 8°C (46.4°F). Refrigerate Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Hydrogen Peroxide TWA: 1 (ppm) from ACGIH (TLV) [United States] TWA: 1 (ppm) from OSHA (PEL) [United States] TWA: 1 STEL: 2 [Canada] TWA: 1.4 (mg/m3) from NIOSH TWA: 1.4 (mg/m3) from OSHA (PEL) [United States] TWA: 1 (ppm) [United Kingdom (UK)] TWA: 1.4 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Slightly acid. Bitter

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Not available

Boiling Point: 108°C (226.4°F)

Melting Point: -33°C (-27.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.1 (Water = 1)

Vapor Pressure: 3.1 kPa (@ 20°C)

Vapor Density: 1.1 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:
Easily soluble in cold water. Soluble in diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable. It contains a stabilizer.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with reducing agents, combustible materials, organic materials, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Light sensitive. Incompatible with reducing materials, ethers (dioxane, furfuran, tetrahydrofuran), oxidizing materials, Metals(eg. potassium, sodium lithium, iron, copper, brass, bronze, chromium, zinc, lead, silver, nickel), metal oxides (eg. cobalt oxide, iron oxide, lead oxide, lead hydroxide, manganese oxide), metal salts (eg. calcium permanganate, salts of iron), manganese, asbestos, vanadium, platinium, tungsten, molybdeum, triethylamine, palladium, sodium pyrophosphate, carboxylic acids, cyclopentadiene, formic acid, rust, ketones, sodium carbonate, alcohols, sodium borate, aniline, mercurous chloride, rust, nitric acid, sodium pyrophosphate, hexavalent chromium compounds, tetrahydrofuran, sodium fluoride organic matter, potassium permanganate, urea, chlorosulfonic acid, manganese dioxide, hydrogen selenide, charcoal, coal, sodium borate, alkalies, cyclopentadiene, glycerine, cyanides (potassium, cyanide, sodium cyanide), nitrogen compounds.. Caused to decompose catalytically by metals (in order of decreasing effectiveness): Osmium, Palladium, Platinum, Iridium, Gold, Silver, Manganese, Cobalt, Copper, Lead. Concentrated hydrogen peroxide may decompose violently or explosively in contact with iron, copper, chromium, and most other metals and their salts, and dust. (Hydrogen Peroxide)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals:
Acute oral toxicity (LD50): 6667 mg/kg (Mouse) (Calculated value for the mixture). Acute dermal toxicity (LD50): 6667 mg/kg (pig) (Calculated value for the mixture).

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH [Hydrogen Peroxide]. Classified 3 (Not classifiable for human.) by IARC [Hydrogen Peroxide]. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. [Hydrogen Peroxide]. Mutagenic for bacteria and/or yeast. [Hydrogen Peroxide]. Contains material which may cause damage to the following organs: blood, upper respiratory tract, skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant). Hazardous in case of skin contact (corrosive), of eye contact (corrosive), of ingestion, of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause cancer and may affect genetic material based on animal data. May be tumorigenic. (Hydrogen Peroxide)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes severe skin irritation and possible burns. Absorption into skin may affect behavior/central nervous system (tremor, ataxia, convulsions), respiration (dyspnea, pulmonary emboli), brain. Eyes: Causes severe eye irritation, superficial clouding, corneal edema, and may cause burns. Inhalation: Causes respiratory tract irritation with coughing, lacrimation. May cause chemical burns to the respiratory tract. May affect behavior/Central nervous system (insomnia, headache, ataxia, nervous tremors with numb extremities) and may cause ulceration of nasal tissue, and , chemical pneumonia, unconciousness, and possible death. At high concentrations, respiratory effects may include acute lung damage, and delayed pulmonary edema. May affect blood. Ingestion: Causes gastrointestional tract irritation with nausea, vomiting, hypermotility, and diarrhea. Causes gastrointestional tract burns. May affect cardiovascular system and cause vascular collapse and damage. May affect blood (change in leukocyte count, pigmented or nucleated red blood cells). May cause difficulty in swallowing, stomach distension and possible cerebal swelling. May affect behavior/central nervous system (tetany, excitement). Chronic Potential Health Effects: Prolonged or repeated skin contact may cause dermatitis. Repeated contact may also cause corneal damage. Prolonged or repeated ingestion may affect metabolism (weight loss). Prolonged or repeated inhalation may affect respiration, blood. (Hydrogen Peroxide)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short/long term degradation products are to be expected.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 5.1: Oxidizing material.

Identification: : Hydrogen peroxide, aqueous solution UNNA: 2014 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York acutely hazardous substances: Hydrogen Peroxide Rhode Island RTK hazardous substances: Hydrogen Peroxide Pennsylvania RTK: Hydrogen Peroxide Florida: Hydrogen Peroxide Minnesota: Hydrogen Peroxide Massachusetts RTK: Hydrogen Peroxide New Jersey: Hydrogen Peroxide TSCA 8(b) inventory: Hydrogen Peroxide SARA 302/304/311/312 extremely hazardous substances: Hydrogen Peroxide CERCLA: Hazardous substances.: Hydrogen Peroxide: 1 lbs. (0.4536 kg);

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS C: Oxidizing material. CLASS E: Corrosive liquid. CLASS F: Dangerously reactive material.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

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

Health: 2

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:46 PM

Last Updated: 11/01/2010 12:00 PM

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MILLSPERSE 802 ANTISCALANT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: MILLSPERSE 802 ANTISCALANT
Product Code:
General or Generic ID: ANTISCALANT

Company

Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
POLY(MALEIC ACID)	26099-09-2	5.0- 15.0
ORGANIC ACID		1.0- 10.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.

Skin
Can cause permanent skin damage. Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage.

Swallowing
Swallowing this material may be harmful or fatal. Symtoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

Inhalation
Breathing this material may be harmful or fatal. Symptoms may include severe irritation and burns to the nose, throat, and respiratory tract.

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), lung edema (fluid buildup in the lung tissue).

Continued on next page

Target Organ Effects
No data

Developmental Information
Based on the available information, risk to the fetus from maternal exposure to this material cannot be assessed.

Cancer Information
This material is not expected to cause cancer in humans since it did not cause cancer in laboratory animals. This material is not listed as a carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or the Occupational Safety and Health Administration.

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin contact, Eye contact, Ingestion - Industrial products are not meant to be swallowed.

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4. FIRST AID MEASURES

Eyes
If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.

Skin
Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and discard contaminated shoes.

Swallowing
Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Note to Physicians
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), eye.

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5. FIRE FIGHTING MEASURES

Flash Point
Not applicable

Continued on next page

Explosive Limit
Not applicable

Autoignition Temperature
No data

Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide.

Fire and Explosion Hazards
No special fire hazards are known to be associated with this product.

Extinguishing Media
Use an extinguishing media appropriate for surrounding fire.

Fire Fighting Instructions
Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

NFPA Rating
Health - 3, Flammability - 0, Reactivity - 1

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6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material. Scoop or scrape up. Put in container for recovery or disposal. May be neutralized with soda ash, TSP, or bicarbonate of soda.

Large Spill
Persons not wearing protective equipment should be excluded from area of spill. Stop spill at source. Dike to prevent spreading. Carefully add lime or sodium carbonate to neutralize acid. Place residue in a container for disposal.

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7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Storage
Product solutions are corrosive to many commonly used materials of construction such as steel, galvanized iron, aluminum, tin and zinc. These solutions can be stored and handled in baked phenolic-lined steel, polyethylene, stainless steel, or reinforced epoxy-plastic equipment. Store in closed containers in a dry, well-ventilated area.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles and face shield (8" min.) in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your industrial hygienist.)

Continued on next page

Skin Protection

Wear resistant gloves such as: nitrile rubber, polyvinyl chloride, To prevent repeated or prolonged skin contact, wear impervious clothing and boots. Wear acid-resistant apron, or in emergency conditions, acid-resistant clothing and boots.

Respiratory Protections

If overexposure has been determined or documented, a NIOSH/MSHA jointly approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators under specified conditions. (See your safety equipment supplier.) Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

Exposure Guidelines

Component

POLY(MALEIC ACID) (26099-09-2)
No exposure limits established

ORGANIC ACID
No exposure limits established

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9. . PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point

(for component) 212.0 F (100.0 C)

Vapor Pressure

(for component) 17.500 mmHg

Specific Vapor Density

< 1.000 @ AIR=1

Specific Gravity

1.040 @ 77.00 F

Liquid Density

8.654 lbs/gal @ 77.00 F
1.040 kg/l @ 25.00 C

Percent Volatiles

85.0 - 100.0 %

Evaporation Rate

SLOWER THAN ETHYL ETHER

Continued on next page

Appearance
CLEAR, STRAW YELLOW LIQUID

State
LIQUID

Physical Form
HOMOGENEOUS SOLUTION

Color
CLEAR, STRAW YELLOW

Odor
No data

pH
1.4 - 2.2

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10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: nitrites, strong alkalis, strong oxidizing agents, sulphites.

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11. TOXICOLOGICAL INFORMATION

This mixture has not been specifically tested.

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12. . ECOLOGICAL INFORMATION

Ecotoxicological Information
This mixture has not been specifically tested.

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13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-531-7106.

Continued on next page

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:
NON-REGULATED BY D.O.T.

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

Other Transportation Information
The Transport Information may vary with the container and mode of shipment.

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed

CERCLA RQ - 40 CFR 302.4(a)
None

CERCLA RQ - 40 CFR 302.4(b)
This material has a RQ of 100 lbs as a D002 Corrosive unlisted hazardous substance.

SARA 302 Components - 40 CFR 355 Appendix A
None

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed( ) Fire( ) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65
None

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68
None listed

International Regulations

Inventory Status
DSL (CANADA) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65
None

Continued on next page

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

Material Safety Data Sheet

8ec:tian 1: PRODUCT AND COMPANY INFORMATION

Product Name(s): Lafarge Hydrated Ume

Productld.ntifiars: Hydrated Ume, Slaked Ume, Dolomitic Hydrated Ume, Ume, Caustic Lime, Ume Hydrate, Calcium Hydroxide, Calcium Oihydroxide, Celcium Magnnium Hydroxide, Type N Ume, Type S Ume

Manufacturer.
Lafarge Nofth America Inc.
12018 Sunrise Valley Drive, Suite 500
Reston, VA 20191

Information Telephone Number:
703-480-3600 (9am to 5pm EST)
Emergency Telephone Number:
1-aoo-451346 (3E Hotline)

Product Use: Hydrated lime is used as an additive for mortar, cement, concrete and conaete products. It 18 also used in soil stabilization, 88 an anti-s11ipping agent in asphalt, for pH adjustment, and in other produc:ta lhat are 'Nidely used in cona1ruction.

Nolle: This MSOS cove many types of hydrated lime. Incividual composition of hazardous constituents will vary between types of hydrated lime.

Section 2: COMPOSITIONANFORMATION ON INGREDIENTS

Component	Percent	CAS Number	OSHA PEL -TWA m,	ACGIH TLV-TWA m m	LDeo (mouse)	LCeo
Calcium Hydroxide		132.O	15 (T); 5 (R)	5 (T)	7300mg/kg, oral	NA
Ma_gnesium Hydroxide		1309-42-8	NA	NA	8500mglkg, oral	NA
Calcium Oxide	0-5	1305-78-S	5 (T)	2 (T)	3059 mg/kg, intraperitoneal	NA
Magnesium Oxide	0-5	1309-48-4	15(1)	10(1)	NA	NA
Catdum Carbonate*	0-3	1317-65-3	15 (T), 5 (R)	3 (R); 10 (T)	NA	NA
Crystalline Silica	0-1	14808-60-7	((10) / (%Si02+2)) (R); ((30) / (%Si0?+2)) (T)	0.025 (R)	NA	NA

Note: Exposure limits for componen1B noted with an • contain no asbestos and <1% crystalline silca

Hydrated lime is produced from the slow addition of water to crushed or ground quicklime (calcium oxide) whidt is procl.lced by bumlng various forms of limestone. Trace amounts of d"lemicals may be detec:ted ring dtemical anatysia. For example, hydrated lime may contain trace amounts of iron oxide, aluminum oxide, fluoride compounds, and other trace compounds.

Sedion 3: HAZARDIDENTIFICATION



Corrosive - causes severe bums.
Toxic - Harmful by inhalation.
(Contains crystalline silica)

Use proper engineering controls, work practices, and personal protective equipment to prevent exposure to wet or dry product.

Read MSOS for details.

Respntory Protedlon

Eye Protection



Section 3: HAZARD IDENTIFICATION (continued)

Emergency Overview: Hydrated lime is a granular, white or gfflf, odortesa powderlis not combuatible or explosive. A single, short-term exposure to the dry powder prnents little or no hazard. Exposure of suf'Ident duration to hydrated lime can cause serious, potentialy irreversible tissue (skin, eye, respirator(trad) damage due to chemical (caustic) bums, including third degree bums.

Potential Health Effects:

Eye Contact: Airborne dust may causeimmedate or delayed i1itatio.1 or inlammation. Eye contact with large amounts of dry powder or with wet hydrated lime can cause modetate eye initation, chemical burns and blindness. Eye exposures require immeciate trst aid - d medical attention to prevent sitftcant damage to the eye.

Skin Contact: Hydrated me may cause dry skin.discomfort. irritation, and severe bums.

bmJ.: Exposure of suflicient duration to wet hydrated lme, or to dry hydrated lime on moist areas of the body, can cause aerioua, potentialy Irreversible damage to skin, eye, respiratory and digestive tracts due to chemical (caustic) bums, including third degree bums. A skin exposure may be hazardous even f there is no pain or discomfort.

Inhalation (llCUte): Breathing Mt may cause nose. throat or lung irritation, inducing choking, depen< ng on the ctewee of exposurehalation of histl levefs of dust can cause chemical burns to the nose, throat andlungs.

hhaldon (chronic): Risk of injury depends on duration and level of exposure.

Silicosis: This product contains aystalline sifica. Prok>nged or repeated inhalation of respirable aysta lne silica from this product can cause silic=osis, a seriousty disabling and fatal lung dtseaae. See Note to Physicians in Section 4 for furtherinformation.

Carcinoqenjcjty: Hydratedlme is not lsted es a cardnogen by IARC or NTP; however, hydrated Hme contans trace amount& of crys1811S1e silica which Is dll88ifted byARC and NTP *9 known human carcinogen.

Aytotmmune p;teae: Some studies show that exposure to respirable crysblline silica (without silicolia) or Chat the disease slicosis may be 8880ciated with theincreased Incidence of several autoimnaane disorders such a aderoderma (flickening of the akin), systemic kipus efYlhematosus, rheumatoid arthritis and diseaaes llfJecting the kidneys.

Tuberculbsis: Siicosis inaeases the risk of tuberculosis.

Renal Disease: Some studies show an increased incidence of chronic kidney disease and end-stage renal disease in woriters exposed to reaplrable aystalline silica.

Ingestion: Do not Ingest hydrated lime. Although hgestion of small quantities of hydrated lime is not known to be harmful, large quantities can cause chemical bums in the mouth, throat, stomach, and digestive tract.

MedicalConditions Aggravftld by Exposure: hdividuals with tung disease (e.g. bronchitis, emphysema, COPO, pulmonary clsease) can be aggravated by exposure.

Section 4: FIRST AID MEASURES

Eye Contact: Rinse eyes thoroughly with water for at least 15 minutes, including under lids, to remove all particles. Seek medical attention for abrasions or acid burns.

Skin Contact: Wash with cool water and a pH neutral soap or a mild skin detergent. Seek medical attention for rash, burns, irritation, and prolonged unprotected exposures to wet hydrated lime, cement, cement mixtures or liquids from wet cement.

Inhalation: Move person to fresh air. Seek medical attention for discomfort or coughing or other symptoms do not subside.

Ingestion: Do not induce vomiting. If conscious, have person drink plenty of water. Seek medical attention or contact poison control center immediately.

Note to Physician: The three types of silicosis include:

- Simple chronic silicosis - which results from long-term exposure (more than 20 years) to low amounts of respirable crystalline silica. Nodules of chronic inflammation and scarring provoked by the respirable crystalline silica form in the lungs and chest lymph nodes. This disease may feature breathlessness and may resemble chronic obstructive pulmonary disease (COPD).
- Accelerated silicosis - occurs after exposure to larger amounts of respirable crystalline silica over a shorter period of time (5-15 years). Inflammation, scarring, and symptoms progress faster in accelerated silicosis than in simple silicosis.
- Acute silicosis – resulting from short-term exposure to very large amounts of respirable crystalline silica. The lungs become very inflamed and may fill with fluid, causing severe shortness of breath and low blood oxygen levels.

Progressive massive fibrosis may occur in simple or accelerated silicosis, but is more common in the accelerated form. Progressive massive fibrosis results from severe scarring and leads to the destruction of normal lung structures.

Section 5: FIREFIGHTING MEASURES

Flash point & Method:	Not flammable	Firefighting Equipment:	Hydrated lime poses no fire-related hazard. A SCBA is recommended to limit exposure to combustion products when fighting any fire.
General Hazard:	Avoid breathing dust. Hydrated lime is caustic.		
Extinguishing Media:	Use extinguishing media appropriate for surrounding fire.	Combustion Products:	None.

Section 6: ACCIDENTAL RELEASE MEASURES

General: Place spilled material into a container. Avoid actions that cause the hydrated lime to become airborne. Avoid inhalation of hydrated lime and contact with skin. Wear appropriate protective equipment as described in Section 8. Scrape wet hydrated lime and place in container. Allow material to dry or solidify before disposal. Do not wash hydrated lime down sewage and drainage systems or into bodies of water (e.g. streams).

Waste Disposal Method: Dispose of hydrated lime according to Federal, State, Provincial and Local regulations.

Section 7: HANDLING AND STORAGE

General: Keep bulk and bagged hydrated lime dry until used. stack bagged material In a aec:ure manner to prevent falling. Bagged material is heavy and poses risks such aa sprains and strains to the back, arms, shoulders and legs during lifting and mixing. Handle with care and use appropriate control measures.

Engulfment hazard. To prevent burial or suffocation. do not enter a confined space. sud1 as a silo, bin, bulk truck, or other storage container or veseel that stonts or contains hydrated lime. Hydrated lime can bu dup or acl'lere to the wals of a confined space. The hycnted lime can release, collapse or fall unexpectecly.

Usage: Cutting, crushing or wincing hardened cement, conaete or o1her aystalllne silca-bearing materials wtll release resplrable crystalline silica. Use all appropriate measures of dust control or suppression, and Peonal Protective Equipment (PPE) deec::ribed in Section 8 below.

Housebeping: Avoid actions that cause the hydrated lime to become aborne during dean-up such as ft:!/sweeping or u'1g compressed air. Ule HEPA vacuum to dear HJp cbl u.e PPE deec:ribed Section 8 below.

StonIge Tempeqtu Unlimited. **Storage Pressure:** Unlimited.

Storage: Sore in a cool, dry and weir ventilated bcation. Do not store near Incorf1>8tlble materials. Keep away from moisture. Do not store or ship in aluminum containers.

Clothing: PrompCty remove and launder clothing that is dusty or wet with hydrated lime. Thorou ty wash Hin after exposure to dust or wet hy<*'ated lime.

Section 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Usebcal exhaust or general dilution ventilation or other suppression methods to maintain «at levels below exposwe limits.

-P1o4lirctiw Equipment (PPE):

Respiratofy Protection: Under ordinary concitions no atory protection is required. Wear a NIOSH approved respirator 1hat is properly fitted and Is good condition when exposed to dust above exposure limits.

Eye Protection: Wear ANSI approved glasses or safety goggles when handling dust or wet hydrated lime to prevent contact wi'1 eyes. Wearing contact enses when using hydrated lime, under dusty concltions, is not recommended.

Skin Protection: Wear glOYes, boot covers and protec:tive clothing impervious to water to prevent skin contact. Do not rely on barrier a-earns. in place ofl11>8fVious gloves. Remove dothing and protective equipment 1hat becomes saturated wittl wet hy<*'ated lime and immedatety wash exposed •reas.

Section I: PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid (powder).	Evaporation Rn:	NA.
Appearmce:	W'tite or 1 1ey powder.	pH (in water):	12.3
Odor:	None.	Boiling Point:	>1000° C
Vapor Prwsu.:	NA.	FrMZing Point:	None, sold.
Vapor Density:	NA.	Viscosity:	None, solid .
Specific Grr1ity:	2 3	Soeubility in Water.	Negligib

Section 10: STABILITY AND REACTIVITY

Stability: Stable, but reacts alowty with carbon dioxde to form calcium and magnesium carbonate. Keep my until use. Hychted lime may react with water, resutting In a Iiii release of heat. depending on the amount of lime (Calcium oxide) present Avoid contact with incompatible materials.

Incompatibilty: Wet hychted lime and cement la alkaine and *is* incompatible with acids, ammonium salt8 and aluminum metal. Hydrated lme and cement dissolves In hydrofluoric add, producing corrosive silicon tetrafluoride gas. Hydrated lme and cement reads wtth water to fonn silicates and ealcium hydroxide. Silicates react with powerful oxidizers such as fluorine, boron trifluoride, chlorine triftuoride, manganese trifluoride, and oxygen diftuoride.

Haardous Polymerization: None.

Haardous Oecompoaition: Hychted lime will decompose at 54QDC to produce caJcium oxde (quickl me), magnesium oxide, and water.

8eGtion 11md 12: TOXICOLOGICAL AND ECOLOG CAL INFORMATION

For questions regarding toxicological and ecological nformation refer to contacthformation h Section 1.

Section 13: DISPOSAL CONSIDERATIONS

Dispose of wnte and containers in compliance with applicable Federal, State, Provincia J and Local regu ations.

SKtion 1': TRANSPORT INFORMATION

This product ea not classified as a Hazardous Material under U.S. DOT or Canac:ian TOG regulations.

Seetian 15: REGULATORY NFORMAT ON

OSHA IMSHA HllZmd Comm Ink:allon: This product is considered by OSHA IMSHA to be a hazardous chemical and shotd be inc:Nded h 1he emp oyer's hazard GOmmunication Proc Jlll 11.

CERCIAI SUPERFUND: This proct is not listed as a CERCLA hazardous IUbstance.

EPCRA SARA Title II: This product has been reviewed according to 1he EPA Hazsd Categories prona1lgated under Sec:tions 311 and 312 of the Superfund Amendment and Reauthorization Al;t of 1986 and is coneKtered a haz-dous chemical and a delayed health hazard.

EPRCA SARA Section 313: This product contains none of 1he substances subject to 1he reporting requ rements of Section 313 of Title III of the Supertind Amendments and Reauthorization Al;t of 1988 and 40 CFR Part 372.

RCRA: f msc:.rded in its purchased fonn, this product would not be a hazardous waste either by Isting or characteristic. However, under RCRA. it is the responsibility of the proct user to determine at the time of diepoaal, whether a material containing the product or derived from the product shotd be dassified as a hazardous waste.

TSCA: Hydrated lime and aystalline silica-e exet from reporting under the inventory update Nie.

California Proposition 65: Cfystalline silica (airborne palticutates of respirab e aiZe) is known by the State of California to cause cancer.

Section 11: REGULATORY INFORMATION contilu

WHMIS IDSL:



Produets containi'lg crystalline sftica and calcium carbonate are classified as D2A, E and are subject to WHMIS requirements.

Section 16: OTHER INFORMATION

Abbreviations:

>	Greater than	NA	Not Applicable
ACGIH	American Conference of Govemmenta J Industrial Hygienists	NFPA	National Fire Protection Association
CAS No	Chemical Abstract Service number	NIOSH	National Institute for Occupational Safety and Health
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	NTP	National Toxicology Program
		OSHA	Occupational Safety and Health Adminis1ration
CFR	Code for Federal Regulations	PEL	Permissible Expoeure Limit
CL	Ceiling Umit	pH	Negative log of hydrogen ion
DOT	U.S. Department of Transportation	PPE	Personal Protective Equipment
EST	Eastern Standard Time	R	Reapirable Particulate
HEPA	High-Efficiency Particulate fjjr	RCRA	Resource Conservation and Recovery Ad
HMIS	Hazardous Materials Identification System	SARA	Superfund Amendments and Reauthorization Ad
IARC	International Agency for Reeearch on Cancer	T	Total Particulate
		TOG	Transportation of Dangerous Goods
LCso	Lethal Concentration	TLV	Threshold Limit Value
LOso	Lethal Dose	TWA	Time Wel"1tecf Average (8 hour)
mg/ml	Milligrams per cubic meter	WHMIS	Wortcplace Hazardous Materials Information System
MSHA	Mine Safety and Health Adninistration		

Thia MSOS (Sections 1-16) was revised on March 1, 2011.

An electronic venion of this MSDS is available at www.lafarge-na.com under the Sustainability section.

Lafarge North America Inc. (LNA) believes the Information contained herein is accurate; however, LNA makes no guarantees with respect to such accuracy and assumes no liability in connection with the use of the information contained herein which is not htended to be and should not be con81rued aa legal advice or as insumg compliance with any federal, state or local laws or regulations. Any party using this product should review all such laws, rules, or regulation& prior to use, including but not limited to US and Canada Federal, Provincial and State regulations.

NO WARRANTY IS MADE, EXPRESS OR IMPLIED, OF MERCHANTABI LITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE.

Propane (Canada)

Safety Data Sheet

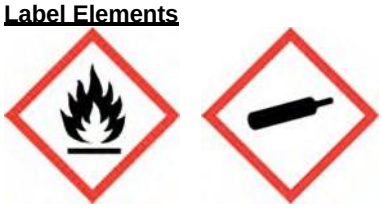
Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Propane (Canada)
SDS Number:	775185
Synonyms/Other Means of Identification:	Petroleum Hydrocarbon
Intended Use:	Fuel
Manufacturer:	ConocoPhillips Canada Limited or its Affiliates PO Box 130, 401 9th Ave. SW Calgary, Alberta T2P 2H7 Canada
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours) CANUTEC (613) 996-6666
Customer Service:	403-233-4000
Technical Information:	403-233-4000
SDS Information:	Phone: 855-244-0762 Email: SDS@conocophillips.com URL: www.conocophillips.com

Section 2: Hazard(s) Identification

Classification
H220 -- Flammable gases -- Category 1
H280 -- Gases under pressure -- Liquefied gas

Label Elements



DANGER
Extremely flammable gas. (H220)*
Gas may reduce oxygen in confined spaces
Contains gas under pressure. May explode if heated. (H280)*

Precautionary Statement(s):
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Leaking gas fire: Do not extinguish, unless leak can be stopped safely. (P377)*
Eliminate all ignition sources if safe to do so. (P381)*
Protect from sunlight. Store in a well ventilated place. (P410+P403)*

** (Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration[1]
Propane	74-98-6	95-100
Propylene	115-07-1	0-5
Ethyl Mercaptan	75-08-1	0-0.02

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Odorized products contain small quantities (<0.1%) ethyl mercaptan as an olfactory indicator.

Section 4: First Aid Measures

Eye Contact: For contact with the liquefied gas, remove contact lenses if present and easy to do, hold eyelids apart and gently flush the affected eye(s) with lukewarm water. Seek immediate medical attention.

Skin Contact: Liquefied gases may cause cryogenic burns or injury. Treat burned or frostbitten skin by flushing or immersing the affected area(s) in lukewarm water. Do not rub affected area. Do not remove clothing that adheres due to freezing. After sensation has returned to the frostbitten skin, keep skin warm, dry, and clean. If blistering occurs, apply a sterile dressing. Seek immediate medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Most important symptoms and effects

Acute: Anesthetic effects at high concentrations.

Delayed: None known or anticipated. See Section 11 for information on effects from chronic exposure, if any.

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 2 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. Contents under pressure. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. If container is not properly cooled, it can rupture in the heat of a fire. Drains can be plugged and valves made inoperable by the formation of ice if rapid evaporation of large quantities of the liquefied gas occurs. Do not allow run-off from fire fighting to enter drains or water courses – may cause explosion hazard in drains and may reignite.

Extinguishing Media: Dry chemical or carbon dioxide is recommended. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. If this cannot be done, allow fire to burn. Move undamaged containers from immediate hazard area if it can be done safely. Stay away from ends of container. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Beware of accumulation of gas in low areas or contained areas, where explosive concentrations may occur. Prevent from entering drains or any place where accumulation may occur. Ventilate area and allow to evaporate. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Water spray may be useful in minimizing or dispersing vapors. If spill occurs on water notify appropriate authorities and advise shipping of any hazard.

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Contents under pressure. Gas can accumulate in confined spaces and limit oxygen available for breathing. Use only with adequate ventilation. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Cold burns may occur during filling operations. Containers and delivery lines may become cold enough to present cold burn hazard.

The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of incomplete combustion products (e.g. carbon monoxide, oxides of sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

Propane and odorant are heavier than air and will collect and pool along the ground or floor. Odorant, therefore, may not be detectable above the location of propane storage or service (for example, odorant in propane released or leaked into the basement of a dwelling may not be detected above the basement).

WARNING - The intensity of the odorant may fade over prolonged storage or in the presence of rust, when placed initially in new or freshly-cleaned storage vessels, or when exposed to masonry.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. Avoid exposing any part of a compressed-gas cylinder to temperatures above 125F(51.6C). Gas cylinders should be stored outdoors or in well ventilated storerooms at no lower than ground level and should be quickly removable in an emergency.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Propane	TWA: 1000 ppm as Aliphatic Hydrocarbon Gases: Alkane (C1-C4)	TWA: 1000 ppm TWA: 1800 mg/m^3	---
Propylene	TWA: 500 ppm	---	---
Ethyl Mercaptan	TWA: 0.5 ppm	Ceiling: 10 ppm Ceiling: 25 mg/m^3	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: Wear thermal insulating gloves and face shield or eye protection when working with materials that present thermal hazards (hot or cold).

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Colorless
Physical Form:	Liquefied Gas
Odor:	Rotten egg / sulfurous
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	10000 mm Hg / 200 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	-54 to -44 °F / -48 to -42 °C
Melting/Freezing Point:	-303 °F / -186 °C
Solubility in Water:	Slight
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	0.5-0.6 @ 60ºF (15.6ºC)

VOC Content(%):	100%
Evaporation Rate (nBuAc=1):	>1
Flash Point:	-163 °F / -108 °C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Lower Explosive Limits (vol % in air):	2.1
Upper Explosive Limits (vol % in air):	9.5
Auto-ignition Temperature:	851 °F / 455 °C

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition. Heat will increase pressure in the storage tank.

Materials to Avoid (Incompatible Materials): Avoid contact with acids, aluminum chloride, chlorine, chlorine dioxide, halogens and oxidizing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful	Asphyxiant. High concentrations in confined spaces may limit oxygen available for breathing. See Signs and Symptoms.	> 20,000 ppm (gas, estimated)
Skin Absorption	Skin absorption is not anticipated		Not Applicable
Ingestion (Swallowing)	Ingestion is not anticipated		Not Applicable

Aspiration Hazard: Not applicable

Skin Corrosion/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause frostbite ("cold" burn).

Serious Eye Damage/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.

Signs and Symptoms: Light hydrocarbon gases are simple asphyxiants and can cause anesthetic effects at high concentrations. Symptoms of overexposure, which are reversible if exposure is stopped, can include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discoloration of the skin), numbness of the extremities, unconsciousness and death.

Skin Sensitization: Skin contact is not anticipated.

Respiratory Sensitization: Not expected to be a respiratory sensitizer.

Specific Target Organ Toxicity (Single Exposure): Not expected to cause organ effects from single exposure.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: Not expected to cause cancer. This substance is not listed as a carcinogen by IARC, NTP or OSHA.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) during pregnancy may have adverse effects on the developing fetus.

The odorant, ethyl mercaptan, can be irritating to the eyes, skin and respiratory tract. At high concentrations, a person can temporarily lose the ability to smell ethyl mercaptan. In addition, some individuals may have an impaired sense of smell, which inhibits the detection of the odorant.

Information on Toxicological Effects of Components

Propane

Target Organs: No systemic or neurotoxic effects were noted in rats exposed to concentrations of propane as high as 12,000 ppm for 28 days.

Reproductive Toxicity: No adverse reproductive or developmental effects were observed in rats exposed to propane; no observed adverse effect level = 12,000 ppm.

Section 12: Ecological Information

Toxicity: Petroleum gases will readily evaporate from the surface and would not be expected to have significant adverse effects in the aquatic environment. Classification: No classified hazards.

Persistence and Degradability: The hydrocarbons in this material are expected to be inherently biodegradable. In practice, hydrocarbon gases are not likely to remain in solution long enough for biodegradation to be a significant loss process.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon gases range from 2.3 for propane to 2.8 for butane and are not regarded as having the potential to bioaccumulate.

Mobility in Soil: Due to the extreme volatility of petroleum gases, air is the only environmental compartment in which these hydrocarbons will be found. In air, these hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half-lives ranging from 3.2 days for n-butane to 7 days for propane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

This material is a gas and would not typically be managed as a waste.

Section 14: Transport Information

Canadian (TDG)

Shipping Description: UN1978, Propane, 2.1
Small Means of Containment
Package Marking: Propane, UN1978
Package Labeling: Flammable gas
Large Means of Containment
Package Placard/Marking: Flammable gas / 1978
ERAP Index: 3000
Emergency Response Guide: 115

Note: ***These dangerous goods may be handled, offered for transport or transported under the UN number and shipping name UN1075, LIQUEFIED PETROLEUM GASES or GAZ DE PETROLE LIQUEFIES. [TDG Regulations - Schedule 2 - Special Provision 29] For a liquefied petroleum gas that is not odorized the words "Not Odorized" or "Not Odourized" or "Sans odorisant" shall be included in the shipping description immediately after the shipping name. [TDG 3.5(1)(c)(i)(B)]***

U.S. Department of Transportation (DOT)

Shipping Description: UN1978, Propane, 2.1,
Non-Bulk Package Marking: Propane, UN1978
Non-Bulk Package Labeling: Flammable gas
Bulk Package/Placard Marking: Flammable gas / 1978
Packaging - References: 49 CFR: 173.306; 173.304; 173.314 & .315 ***(Exceptions; Non-bulk; Bulk)***
Hazardous Substance: See Section 15 for RQ`s
Emergency Response Guide: 115
Note: ***For domestic transportation only, UN1075 may be substituted for the UN number shown as long as the substitution is consistent on package markings, shipping papers, and emergency response information. See 49 CFR 172.102 Special Provision 19.***
Containers of NON-ODORIZED liquefied petroleum gas must be marked either NON-ODORIZED or NOT ODORIZED as of September 30, 2006. [49 CFR 172.301(f), 326(d), 330(c) and 338(e)]
The following alternate shipping description order may be used until January 1, 2013:
Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: *Not applicable*
Other shipping description elements may be required for DOT compliance.

International Maritime Dangerous Goods (IMDG)

Shipping Description: UN1978, Propane, 2.1
Non-Bulk Package Marking: Propane, UN1978
Labels: Flammable gas
Placards/Marking (Bulk): Flammable gas / 1978
Packaging - Non-Bulk: P200
EMS: F-D, S-U

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN1978
Proper Shipping Name: Propane
Hazard Class/Division: 2.1
Non-Bulk Package Marking: Propane, UN1978
Labels: Flammable gas
ERG Code: 10L
Note: ***Special provision A1 applies to this product.***

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	*Forbidden*	*Forbidden*	200
Max. Net Qty. Per Package:	*Forbidden*	*Forbidden*	150 kg

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: No
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration[1]	de minimis
Propylene	0-5	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):
EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

WARNING: Chemicals known to the State of California to cause cancer, birth defects or other reproductive harm are created by the combustion of Propane.

International Hazard Classification

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 Regulations.

WHMIS Hazard Class:
A - Compressed Gas
B1 - Flammable Gases

National Chemical Inventories
All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	17-Aug-2012
Status:	FINAL
Previous Issue Date:	03-Apr-2012
Revised Sections or Basis for Revision:	Regulatory information (Section 15)
SDS Number:	775185

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

255 Norman.
Lachine (Montreal), Que
H8R 1A3

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 RoadIRail
WHMIS CLASS: D-2A		Not controlled under TDG (Canada). PIN: Not applicable. PG: Not applicable.
		

Section I. Product Identification and Uses

Product name	SODIUM BORATE, ANHYDROUS
Chemical formula	Na2B4O7
Synonyms	Sodium tetraborate, Sodium borate anhydrous, Sodium pyroborate, Borax glass, AC-8266T, MR-103, 80950, 029-940-01, 029-940-02, 029-940-03
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3
Material uses	For laboratory use only.

CI#	Not available.
CAS#	1330-43-4
Code	AC-8266T
Formula eight	201.27
Supersedes	

Section II. Ingredients

Name	CAS #	%	TLV
1) SODIUM BORATE	1330-43-4	98-100	Exposure limit: ACGIH TWA 2 mg/m3; STEL 6 mg/m3

Toxicity values of the hazardous ingredients

SODIUM BORATE DECAHYDRATE:
ORAL (LD50): Acute: 2660 mg/kg (Rat). 2000 mg/kg (Mouse). 5330 mg/kg (Guinea pig).
ORAL (LDLo): Acute: 709 mg/kg (Man).

Section III. Physical Data

Physical state and appearance L dor	Solid. (White crystalline solid. Odorless.)
pH (1o solnI ater)	9.3
dor threshold	Not available.
Percent volatile	0% at 21°C
Freezing point	742°C
Boiling point	Not applicable.
Specific gravity	2.367 (Water = 1)
Vapor density	Not applicable.
Vapor pressure	Not applicable.
WaterIoil dist. coeff.	Not applicable.
Evaporation rate	Not applicable.
Solubility	3.1 to 5.8% @ 25°C (in H2O)

Section IV. Fire and Explosion Data

Flash point	Not applicable.
Flammable limits	Not applicable.
Auto-ignition temperature	Not applicable.
Fire degradation products	Oxides of sodium.
Fire extinguishing procedures	Use extinguishing media suitable for surrounding materials. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
Fire and Explosion Hazards	The product is not sensitive to impact. The product is not sensitive to static discharge. Emits toxic fumes under fire conditions.

Section V. Toxicological Properties

Routes of entry	Inhalation and ingestion. Eye contact. Skin contact. Skin absorption.
Effects of Acute Exposure	Harmful by ingestion, inhalation or skin absorption. Irritant. Target organs: respiratory system, eyes, skin.
Eye	Causes irritation. May cause slight burning sensation due to heat of hydration.
Skin	Causes skin irritation. May cause desquamation. Can be absorbed through damaged skin causing symptoms similar to ingestion.
Inhalation	Material is irritating to mucous membranes and upper respiratory tract. See ingestion.
Ingestion	Causes gastrointestinal irritation. May cause central nervous system depression (headache, nausea, vomiting, dizziness, abdominal pain, etc...), diarrhea, oliguria, anuria, erythema, macular rash, kidney damage, cardiovascular collapse, shock and death if ingested in large amounts. Toxic effects may be delayed.

Section V. Toxicological Properties

Effects of Chronic verexposure	May cause nose irritation, dyspnea, abdominal pain, reversible erythema and/or rash, central nervous system effects, dizziness, macular rash and lung damage. Animal studies show that ingestion of large amounts of borates over prolonged periods of time cause a decrease in sperm production and testicle size in male laboratory animals and developmental effects if fetuses of pregnant female 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. Call a physician.
Skin contact	Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs or persists 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. Call a physician.
Ingestion	If conscious, wash out mouth with water. Have conscious person drink several glasses of water or milk. 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.
Hazardous decomp. products	Not available.
Incompatibility	Strong oxidizing agents, acids, metallic salts, alkaloids, zirconium, reducing agents (alkali metals, metals hydrides, etc...).
Reaction Products	Product dissolves slowly in water with evolution of heat. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

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. Sweep up and place in container for disposal. Avoid raising dust. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch spilled material.
Waste disposal	According to all applicable regulations. Harmful to aquatic life at low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.
Storage and Handling	Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe dust. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Avoid raising dust. Empty containers may contain a hazardous residue. Handle and open container with care. Minimize dust generation and exposure - use dust mask or appropriate protection. 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. Product is highly hygroscopic.

Section IX. Protective Measures

Protective clothing	Splash goggles. Impervious 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 in a chemical fume hood to keep airborne levels below recommended exposure limits. Do not use in unventilated spaces.

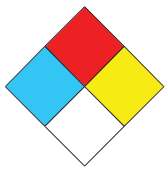
Section X. Other Information

Special Precautions or comments

Teratogen! Reproductive toxin! Irritant! Do not breathe dust. Avoid all contact with the product. Avoid prolonged or repeated exposure. Manipulate in a well ventilated area or under an adequate fume hood. Handle and open container with care. Container should be opened only by a technically qualified person.

NOTES TO PHYSICIAN: Gastric lavage with 5% sodium bicarbonate is suggested. This should be followed by saline catharsis. Assure adequate hydration. Borax is not considered an acute poison. After ingestion or absorption into the bloodstream of large amounts (15 grams or more), symptoms may appear after 24-72 hours. Borates are readily dissipated through the urine (70% in the first 24 hours).

RTECS NO: ED4588000 (Sodium borate).



NFPA

Prepared by MSDS DepartmentIDepartement de F.S..

Validated 23-Sep-2009

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.





Health	3
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Sodium Cyanide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Cyanide

Catalog Codes: SLS2314, SLS3736

CAS#: 143-33-9

RTECS: VZ7525000

TSCA: TSCA 8(b) inventory: Sodium Cyanide

CI#: Not available.

Synonym:

Chemical Name: Sodium Cyanide

Chemical Formula: NaCN

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium Cyanide	143-33-9	100

Toxicological Data on Ingredients: Sodium Cyanide: ORAL (LD50): Acute: 6.44 mg/kg [Rat]. DERMAL (LD50): Acute: 10.4 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of acids, of moisture.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Dangerous on contact with acids, acid fumes, water or stream. It will produce toxic and flammable vapors of CN-H and sodium oxide. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas. When heated to decomposition it emits toxic fumes hydgrogen cyanide and oxides of nitrogen

Special Remarks on Explosion Hazards: Fusion mixtures of metal cyanides with metal chlorates, perchlorated or nitrates causes a violent explosion

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
STEL: 5 (mg/m3) from ACGIH (TLV) [United States] SKIN CEIL: 4.7 from NIOSH CEIL: 5 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Granular solid. Flakes solid.)

Odor:
Faint almond-like odor. Odorless when perfectly dry. Emits odor of hydrogen cyanide when damp.

Taste: Not available.

Molecular Weight: 49.01 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 1496°C (2724.8°F)

Melting Point: 563°C (1045.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.595 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Vapor Density of Hydrogen Cyanide gas: 0.941

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Soluble in cold water. Slightly soluble in Ethanol

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, moisture, incompatibles.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity:
Corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Violent reaction with fluorine gas, magnesium, nitrates, nitric acid. Dangerous on contact with acids, acid fumes, water or stream. It wil produce toxic and flammable vapors of CN-H and sodium oxide. Cyanide may react with CO2 in ordinary air to form toxic hydrogen cyanide gas. Strong oxidizers such as acids, acid salts, chlorates, and nitrates. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas.

Special Remarks on Corrosivity: Corrosive to aluminum

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 6.44 mg/kg [Rat]. Acute dermal toxicity (LD50): 10.4 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects (maternal and paternal fertility) based on animal data.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health effects: Skin: May cause itching and irritation. May be fatal if absorbed through injured skin with symtpoms similar to those noted for inhalation and ingestion. Eyes: May cause eye irritation and eye damage. Inhalation: May cause respiratory tract irritation. May be fatal if inhaled. The substance inhibits cellular respiration causing metabolic asphyxiation. May cause headache, weakness, dizziness, labored breathing, nausea, vomiting. May be followed by cardiovascular effects, unconciousness, convulsions, coma, and death Ingestion: May be fatal if swallowed. May cause

gastrointestinal tract irritation with nausea, vomiting. May affect behavior and nervous systems(seizures, convulsions, change in motor activity, headache, dizziness, confusion, weakness stupor, aniexity, agitation, tremors), cardiovascular system, respiration (hyperventilation, pulmonary edema, breathing difficulty, respiratory failure), cardiovascular system (palpitations, rapid heart beat, hypertension, hypotension). Massive doses by produce sudden loss of conciousness and prompt death from respiratory arrest. Smaller but still lethal doses on the breath or vomitus. Chronic Potential Health Effects: Central Nervous system effects (headaches, vertigo, insomnia, memory loss, tremors, fatigue), fatigue, metabolic effects (poor appetite), cardiovascular effects (chest discomfort, palpitations), nerve damage to the eyes, or dermatitis, respiratory tract irritation, eye irritation, or death can occur. may prolong the illness for 1 or more hours. A bitter almond odor may be noted

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Sodium cyanide UNNA: 1689 PG: I

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut carcinogen reporting list.: Sodium Cyanide Illinois chemical safety act: Sodium Cyanide New York release reporting list: Sodium Cyanide Rhode Island RTK hazardous substances: Sodium Cyanide Pennsylvania RTK: Sodium Cyanide Minnesota: Sodium Cyanide Massachusetts RTK: Sodium Cyanide Massachusetts spill list: Sodium Cyanide New Jersey: Sodium Cyanide New Jersey spill list: Sodium Cyanide Louisiana RTK reporting list: Sodium Cyanide Louisiana spill reporting: Sodium Cyanide California Director's List of Hazardous Substances: Sodium Cyanide TSCA 8(b) inventory: Sodium Cyanide TSCA 4(a) final test rules: Sodium Cyanide TSCA 8(a) PAIR: Sodium Cyanide TSCA 8(d) H and S data reporting: Sodium Cyanide TSCA 12(b) one time export: Sodium Cyanide SARA 302/304/311/312 extremely hazardous substances: Sodium Cyanide CERCLA: Hazardous substances.: Sodium Cyanide: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-6: Reactive and very flammable material. CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive solid.

DSCL (EEC):
R27/28- Very toxic in contact with skin and if swallowed. R41- Risk of serious damage to eyes. S1/2- Keep locked up and out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water S36/37- Wear suitable protective clothing and gloves. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

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

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:58 PM

Last Updated: 06/09/2012 12:00 PM

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Health	3
Fire	0
Reactivity	2
Personal Protection	J

Material Safety Data Sheet
Sodium hydroxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium hydroxide

Catalog Codes: SLS3298, SLS1081, SLS2503, SLS3925, SLS1705

CAS#: 1310-73-2

RTECS: WB4900000

TSCA: TSCA 8(b) inventory: Sodium hydroxide

CI#: Not available.

Synonym: Caustic Soda

Chemical Name: Sodium Hydroxide

Chemical Formula: NaOH

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	100

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to mucous membranes, upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: metals

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions: Not available

Special Remarks on Fire Hazards:
sodium hydroxide + zinc metal dust causes ignition of the latter. Under proper conditions of temperature, pressure and state of division, it can ignite or react violently with acetaldehyde, ally alcohol, allyl chloride, benzene-1,4-diol, chlorine trifluoride, 1,2 dichlorethylene, nitroethane, nitromethane, nitroparaffins, nitropropane, cinnamaldehyde, 2,2-dichloro-3,3-dimethylbutane. Sodium hydroxide in contact with water may generate enough heat to ignite adjacent combustible materials. Phosphorous boiled with NaOH yields mixed phosphines which may ignite spontanously in air. sodium hydroxide and cinnamaldehyde + heat may cause ignition. Reaction with certain metals releases flammable and explosive hydrogen gas.

Special Remarks on Explosion Hazards:
Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzenesulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aquesous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxde + impure tetrahydrofuran, which can contain peroxides, can

cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Hygroscopic. Deliquescent.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
STEL: 2 (mg/m3) from ACGIH (TLV) [United States] TWA: 2 CEIL: 2 (mg/m3) from OSHA (PEL) [United States] CEIL: 2 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Deliquescent solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 40 g/mole

Color: White.

pH (1% soln/water): 13.5 [Basic.]

Boiling Point: 1388°C (2530.4°F)

Melting Point: 323°C (613.4°F)

Critical Temperature: Not available.

Specific Gravity: 2.13 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, moisture, moist air

Incompatibility with various substances:
Highly reactive with metals. Reactive with oxidizing agents, reducing agents, acids, alkalis, moisture.

Corrosivity: Not available.

Special Remarks on Reactivity:
Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahyrofuran is very exothermic, a mild explosion being noted on one occassion. Reactive with water, acids (mineral, non-oxidizing, e.g. hydrochloric, hydrofluoric acid, muriatic acid, phosphoric), acids (mineral, oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, foraldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (acetone, acetophenone, MEK, MIBK), acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, powdered metals and metals (i.e aluminum, tin, zinc, hafnium, raney nickel), metals (alkali and alkaline e.g. cesium, potassium, sodium), metal compounds (toxic e.g. berylium, lead acetate, nickel carbonyl, tetraethyl lead), mitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic e.g. nitrobenzene, nitromethane), acetic anhydride, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrosulfuric acid, oleum, propiolactone, acylonitrile, phorosous pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen.

Special Remarks on Corrosivity: Very caustic to aluminum and other metals in presence of moisture.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. May cause damage to the following organs: mucous membranes, upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Rabbit] - Route: Oral; Dose: 500 mg/kg

Special Remarks on Chronic Effects on Humans: May affect genetic material. Investigation as a mutagen (cytogenetic analysis)

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sodium hydroxide, solid UNNA: 1823 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide California Director's List of Hazardous Substances: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):
R35- Causes severe burns. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37/39- Wear suitable gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 2

Personal Protection: j

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

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:32 PM

Last Updated: 11/01/2010 12:00 PM

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MATERIAL SAFETY DATA SHEET

Sodium Hypochlorite 5-20%

Section 01 - Chemical And Product And Company Information

Product Identifier ..... Sodium Hypochlorite (5-20%)

Product Use ..... Disinfectant, bleaching agent. source of available chlorine, deodorizer.

Supplier Name..... ClearTech Industries Inc.
2302 Hanselman Avenue
Saskatoon, SK. Canada
S7L SZ3

Prepared By..... ClearTech Industries Inc. Technical Department
Phone: (306)664-2522

Preparation Date..... December 22, 2010

24-Hour Emergency Phone..... 306-664-2522



Section 02 - Composition / Information on Ingredients

Hazardous Ingredients.....	Sodium Hypochlorite	4.90-16 .80%
CAS Number.....	Sodium Hypochlorite	7681-52-9

Synonym (s)..... Industrial bleach, hypo, bleach, Javel water, household bleach

Section 03 - Hazard Identification

Inhalation..... Irritant of the nose and throat, causing coughing, difficulty breathing, and pulmonary edema.

Skin Contact / Absorption..... Causes severe skin irritation with blistering and ulceration.

Eye Contact..... Causes severe irritation of the mucous membranes of the eyes. May cause severe eye damage.

Ingestion..... Burning of the mouth and throat, abdominal cramps, nausea, vomiting, diarrhea, shock. May lead to convulsions, coma, and even death.

Exposure Limits..... ACGIH TLV-TWA: 0.5ppm (chlorine)

Section 04 - First Aid Measures

Inhalation..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek immediate medical attention.

Skin Contact / Absorption..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.

Eye Contact..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion..... Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Give large amounts of water Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.

Additional Information..... Not available

Section 05 - Fire Fighting

Conditions of Flammability..... Non-flammable

Means of Extinction..... Product does not bum Use appropriate extinguishing media for material that is supplying the fuel to the fire.

Flash Point..... Not applicable

Auto-ignition Temperature..... Not applicable

Upper Flammable Limit..... Not applicable

Lower Flammable Limit..... Not applicable

Hazardous Combustible Products... Decomposition may produce chlorine gas and/or hydrogen chloride gas,

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Explosion Hazards..... Pressure buildup in containers could result in an explosion when heated or in contact with acidic fumes. Vigorous reaction with oxidizable organic materials may result in a fire.

Section 06 - Accidental ReJease Measures

Leak / Spill..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Restrict access to spill area until clean up is complete. Prevent material from entering sewers, waterways or confined spaces. Soak up smaller spills with absorbent material that does not react with spilled material. Flush with water to remove any residue.

Deactivating MateriaJs..... Spills can be carefully neutralzed first with sodium sulphite, sodium metabisulphite or other dechlorination agent for no chlorine residual, then a pH adjustment may be required with hydrochloric acid until the pH is 7. Note neutralization reactions may produce heat so necessary precautions must be taken. Local regulatory agencies should also be contacted for proper disposal.

Section 07 - Handling and Storage

Handling Procedures..... Use proper equipment for lifting and ttansporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful e)(posure.

Storage Requirements..... Store in a cool. dry, well-ventilated place. Keep container tightly closed. and away from incompatible materials_ Venting of containers Is advisable.

Section 08 - Personal Protection and Exposure Controls

Protective Equipment

Eyes..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.

Respiratory..... A NIOSH-approved respirator sutable for chlorine is recommended. Where a higher level of protection is required, use a self-contained breathing apparatus.

Gloves..... Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Clothing..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Footwear..... Impervious boots of chemically resistant material should be worn at all times.

Engineering Controls

Ventilation Requirements..... Mechanical ventilation (dilution or local exhaust). process or personnel enclosure and control of process conditions should be provided. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other..... Emergency shower and eyewash should be in close pro.ximity.

Section 09 - Physical and Chemical Properties

Physical State..... Liquid

Odor and Appearance..... Strong chlorine odour. Clear, greenish-yellow solution.

Odor Threshold..... Not available

Specific Gravity (Water-1)..... 1.17 at 20°c (12% trade)

Vapor Pressure (mm Hg, 20C)..... 12.1mm Hg at 20°c (12.5 wt %)

Vapor Density (Air-1)..... Not available

Evaporation Rate..... Not available

Boiling Point..... Slowly decomposes above 40°C.

Freeze/Melting Point..... --15°C (12% trade)

pH..... < 12

Water/Oil Distribution Coefficient.... Not available

Bulk Density..... Not available

% Volatiles by Volume..... Not available

Solubility in Water..... Complete

Molecular Formula..... NaOCl

Molecular Weight..... 74.44

Section 10 - Stability and Reactivity

Stability..... Unstable at temperatures above 40°C, in sunlight, and in contact with acid.

Incompatibility..... Incompatible with strong acids, ammonia, oxidizable materials. nickel, copper, tin. manganese, and iron.

Hazardous Products of Decomposition.. Chlorine (by reaction with acids), oxygen (by reaction with nickel, copper. tin, manganese, iron), sodium chloride, sodium chlorate, with increased temperature.

Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Strong irritant

Sensitization..... Not available

Chronic/Acute Effects..... If over-exposed to the solution, there will be constant irritation of the eyes, nose, and throat.

Synergistic Materials..... Not available

Animal Toxicity Data..... LD_{50} (oral, rat): 8910mg/kg (undiluted sodium hypochlorite)

Carcinogenicity..... Not considered to be carcinogenic (IARC and ACGIH).

Reproductive Toxicity..... Not available

Teratogenicity..... Not available

Mutagenicity..... Not available

Section 12 - Ecological Information

Fish Toxicity..... Not available

Biodegradability..... Not available

Environmental Effects..... Not available

Section 13 - Disposal Consideration

Waste Disposal..... Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transportation Information

TOG Classification

Class..... 8 (not regulated at solutions below 7%)

Group..... III (not regulated at solutions below 7%)

PIN Number..... UN 1791(not regulated at solutions below 7%)

Other..... Secure containers (full and/or empty) with suitable hold down devises during shipment.

Section 15 - Regulatory Information

WHMIS Classification.....E

NOTE: THE PRODUCT LISTED ON THIS MSDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS MSDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for disinfection and oxidation at a maximum dosage for the following:

sodium hypochlorite 5%:200mg/L
sodium hypochlorite 6%: 175mg/L
sodium hypochlorite 7%; 161mg/L
sodium hypochlorite 8%: 146mg/L
sodium hypochlorite 9%: 131mg/L
sodium hypochlorite 10%: 116rng/L
sodium hypochlorite 11%:101mg/L
sodium hypochlorite 12%: 87mg/L
sodium hypochlorite 13%: 82mg/L
sodium hypochlorite 14%: 76mg/L
sodium hypochlorite 15%; 70mg/L
sodium hypochlorite 16%:66mg/L
sodium hypochlorite 17%: 62mg/L
sodium hypochlorite 18%: 58mg/L
sodium hypochlorite 19%; 54mg/L
sodium hypochlorite 20%: 50mg/L

Sanitizer Use: to obtain 10 liters of a 200 mg/L solution as available chlorine, use 16.7 ml of Hypochlor-12 for each 10 liters of clean, potable water.

Section 16 • Other Information

Note: The responsibifity to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, end assume no liability for damages incurred by the use of this material. It is the responsibmty of the user to comply with all applicable laws and regulations.

Attention: Receiver of the chemical goods / MSDS coordinator

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution® initiative, ClearTech Industries Inc. and ts associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

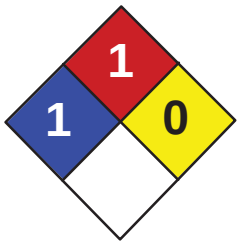
ClearTech Industries Inc. - Locations

Corporate Head Office: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3
Phone: 306--664-2522
Fax: 306--665-6216

www.ClearTech.ca

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Wav	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40th St. S.E	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180th Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42SX2	306-721-7737	306-721-6611
Winnioea, MB.	340 Saulteaux Crescent	R3J 3T2	204-967-9777	204-967-9770
Mississauqa, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

24 Hour Emergency Number - All Locations - 306-664-2522



Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Ethylenediaminetetraacetic Acid Tetrasodium Salt MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylenediaminetetraacetic Acid Tetrasodium Salt

Catalog Codes: SLE2284

CAS#: 10378-23-1

RTECS: AH5075000 (For CAS no. 64-02-8 known as EDTA Tetrasodium salt , anhydrous)

TSCA: TSCA 8(b) inventory: No products were found.

CI#: Not available.

Synonym: Versene, Kalex, Hampene, Dissolvine; EDTA tetrasodium salt dihydrate; Tetrasodium EDTA dihydrate; Tetrasodium salt EDTA dihydrate; Tetrasodium salt of EDTA, dihydrate; Tetrasodium salt of ethylenediaminetetraacetic acid, dihydrate; Sodium salt of ethylenediaminetetraacetic acid, dihydrate; Sodium ethylenediaminetetraacetate, dihydrate; Sodium ethylenediaminetetraacetic acid, dihydrate; Sodium EDTA, dihydrate; Edetate sodium dihydrate; Edetic acid tetrasodium salt, dihydrate; Endrate tetrasodium; Ethylenebis(iminodiacetic acid) tetrasodium salt, dihydrate; Ethylenediaminetetraacetic acid, tetrasodium salt, dihydrate ; Edathaniltetrasodium , dihydrate ; N , N'-Ethylenediaminediacetic acid tetrasodium salt.

Chemical Name: Acetic acid, (etrhylenedinitrilo)tetra-, tetrasodium salt, dihydrate

Chemical Formula: C10H12N2Na4O8.2H2O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylenediaminetetraacetic acid tetrasodium salt	10378-23-1	100

Toxicological Data on Ingredients: Ethylenediaminetetraacetic acid tetrasodium salt: ORAL (LD50): Acute: >2000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects: CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

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

Serious Inhalation: Not available.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: CLOSED CUP: Higher than 93.3°C (200°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...). Some metallic oxides.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances: Slightly explosive in presence of open flames and sparks. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions: SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: As with most organic solids, fire is possible at elevated temperatures

Special Remarks on Explosion Hazards: Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill: Use a shovel to put the material into a convenient waste disposal container. Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions: Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill: Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 416.23 g/mole

Color: White.

pH (1% soln/water): 11.3 [Basic.]

Boiling Point: Not available.

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: Bulk Density: 0.77 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Avoid contact with aluminum, copper, copper alloys, zinc, and nickel, and strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): >2000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: upper respiratory tract, skin, eyes.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Acute Potential Health effects: Skin: May cause skin irritation. Eyes: May cause eye irritation. Inhalation: May cause irritation of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation. The toxicological properties of this substance have not been fully investigated.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 760 mg/l 96 hours [Bull gill sunfish]. 59.8 mg/l 96 hours [Fathead Minnow].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: No products were found.

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

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

DSCL (EEC): This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

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

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 11/01/2010 12:00 PM

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Health	3
Fire	0
Reactivity	2
Personal Protection	

Material Safety Data Sheet
Sulfuric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sulfuric acid

Catalog Codes: SLS2539, SLS1741, SLS3166, SLS2371, SLS3793

CAS#: 7664-93-9

RTECS: WS5600000

TSCA: TSCA 8(b) inventory: Sulfuric acid

CI#: Not applicable.

Synonym: Oil of Vitriol; Sulfuric Acid

Chemical Name: Hydrogen sulfate

Chemical Formula: H2-SO4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sulfuric acid	7664-93-9	95 - 98

Toxicological Data on Ingredients: Sulfuric acid: ORAL (LD50): Acute: 2140 mg/kg [Rat.]. VAPOR (LC50): Acute: 510 mg/m 2 hours [Rat]. 320 mg/m 2 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged

contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion:
Products of combustion are not available since material is non-flammable. However, products of decompostion include fumes of oxides of sulfur. Will react with water or steam to produce toxic and corrosive fumes. Reacts with carbonates to generate carbon dioxide gas. Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.

Fire Hazards in Presence of Various Substances: Combustible materials

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Metal acetylides (Monocesium and Monorubidium), and carbides ignite with concentrated sulfuric acid. White Phosphorous + boiling Sulfuric acid or its vapor ignites on contact. May ignite other combustible materials. May cause fire when sulfuric acid is mixed with Cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phorphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates.

Special Remarks on Explosion Hazards:
Mixturesofsulfuricacidandanyofthefollowingcanexplode: p-nitrotoluene, pentasilver trihydroxydiaminophosphate, perchlorates, alcohols with strong hydrogen peroxide, ammonium tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro compounds, nitrates, carbides, phosphorous, iodides, picratres, fulminats, dienes, alcohols (when heated) Nitramide decomposes explosively on contact with concentrated sulfuric acid. 1,3,5-Trinitrosohexahydro-1,3,5-triazine + sulfuric acid causes explosive decompositon.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage:
Hygroscopic. Reacts. violently with water. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23°C (73.4°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 STEL: 3 (mg/m3) [Australia] Inhalation TWA: 1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 1 (mg/m3) from NIOSH [United States] Inhalation TWA: 1 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Thick oily liquid.)

Odor: Odorless, but has a choking odor when hot.

Taste: Marked acid taste. (Strong.)

Molecular Weight: 98.08 g/mole

Color: Colorless.

pH (1% soln/water): Acidic.

Boiling Point:
270°C (518°F) - 340 deg. C Decomposes at 340 deg. C

Melting Point: -35°C (-31°F) to 10.36 deg. C (93% to 100% purity)

Critical Temperature: Not available.

Specific Gravity: 1.84 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in cold water. Sulfuric is soluble in water with liberation of much heat. Soluble in ethyl alcohol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability:
Conditions to Avoid: Incompatible materials, excess heat, combustible material materials, organic materials, exposure to moist air or water, oxidizers, amines, bases. Always add the acid to water, never the reverse.

Incompatibility with various substances:
Reactive with oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.

Corrosivity:
Extremely corrosive in presence of aluminum, of copper, of stainless steel(316). Highly corrosive in presence of stainless steel(304). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product. Incompatible (can react explosively or dangerously) with the following: ACETIC ACID, ACRYLIC ACID, AMMONIUM HYDROXIDE, CRESOL, CUMENE, DICHLOROETHYL ETHER, ETHYLENE CYANOHYDRIN, ETHYLENEIMINE, NITRIC ACID, 2-NITROPROPANE, PROPYLENE OXIDE, SULFOLANE, VINYLIDENE CHLORIDE, DIETHYLENE GLYCOL MONOMETHYL ETHER, ETHYL ACETATE, ETHYLENE CYANOHYDRIN, ETHYLENE GLYCOL MONOETHYL ETHER ACETATE, GLYOXAL, METHYL ETHYL KETONE, dehydrating agents, organic materials, moisture (water), Acetic anhydride, Acetone, cyanohydrin, Acetone+nitric acid, Acetone + potassium dichromate, Acetonitrile, Acrolein, Acrylonitrile, Acrylonitrile +water, Alcohols + hydrogen peroxide, ally compounds such as Allyl alcohol, and Allyl Chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium triperchromate, Aniline, Bromate + metals, Bromine pentafluoride, n-Butyraldehyde, Carbides, Cesium acetylene carbide, Chlorates, Cyclopentanone oxime, chlorinates, Chlorates + metals, Chlorine trifluoride, Chlorosulfonic acid, 2-cyano-4-nitrobenzenediazonium hydrogen sulfate, Cuprous nitride, p-chloronitrobenzene, 1,5-Dinitronaphthlene +

sulfur, Diisobutylene, p-dimethylaminobenzaldehyde, 1,3-Diazidobenzene, Dimethylbenzylcarbinol + hydrogen peroxide, Epichlorohydrin, Ethyl alcohol + hydrogen peroxide, Ethylene diamine, Ethylene glycol and other glycols, , Ethylenimine, Fulminates, hydrogen peroxide, Hydrochloric acid, Hydrofluoric acid, Iodine heptafluoride, Indane + nitric acid, Iron, Isoprene, Lithium silicide, Mercuric nitride, Mesityl oxide, Mercury nitride, Metals (powdered), Nitromethane, Nitric acid + glycerides, p-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Perchloric acid, Permanganates + benzene, 1-Phenyl-2-methylpropyl alcohol + hydrogen peroxide, Phosphorus, Phosphorus isocyanate, Picrates, Potassium tert-butoxide, Potassium chlorate, Potassium Permanganate and other permanganates, halogens, amines, Potassium Permanganate + Potassium chloride, Potassium Permanganate + water, Propiolactone (beta)-, Pyridine, Rubidium aceteylene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thalium (I) azidodithiocarbonate, Zinc chlorate, Zinc Iodide, azides, carbonates, cyanides, sulfides, sulfites, alkali hydrides, carboxylic acid anhydrides, nitriles, olefinic organics, aqueous acids, cyclopentadiene, cyano-alcohols, metal acetylides, Hydrogen gas is generated by the action of the acid on most metals (i.e. lead, copper, tin, zinc, aluminum, etc.). Concentrated sulfuric acid oxidizes, dehydrates, or sulfonates most organic compounds.

Special Remarks on Corrosivity:
Non-corrosive to lead and mild steel, but dillute acid attacks most metals. Attacks many metals releasing hydrogen. Minor corrosive effect on bronze. No corrosion data on brass or zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2140 mg/kg [Rat.]. Acute toxicity of the vapor (LC50): 320 mg/m3 2 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. May cause damage to the following organs: kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
Mutagenicity: Cytogenetic Analysis: Hamster, ovary = 4mmol/L Reproductive effects: May cause adverse reproductive effects based on animal data. Developmental abnormalities (musculoskeletal) in rabbits at a dose of 20 mg/m3 for 7 hrs.(RTECS) Teratogenecity: neither embryotoxic, fetoxic, nor teratogenetic in mice or rabbits at inhaled doses producing some maternal toxicity

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes severe skin irritation and burns. Continued contact can cause tissue necrosis. Eye: Causes severe eye irritation and burns. May cause irreversible eye injury. Ingestion: Harmful if swallowed. May cause permanent damage to the digestive tract. Causes gastrointestial tract burns. May cause perforation of the stomach, GI bleeding, edema of the glottis, necrosis and scarring, and sudden circulatory collapse(similar to acute inhalation). It may also cause systemic toxicity with acidosis. Inhalation: May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the repiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Cause corrosive action on mucous membranes. May affect cardiovascular system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death. May also affect teeth(changes in teeth and supporting structures - erosion, discoloration). Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect behavior (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (ischemic heart leisons), and respiratory system/lungs(pulmonary edema, lung damage), teeth (dental discoloration, erosion). Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 49 mg/l 48 hours [bluegill/sunfish].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Sulfuric acid may be placed in sealed container or absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Be sure to consult with local or regional authorities (waste regulators) prior to any disposal. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sulfuric acid UNNA: 1830 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Sulfuric acid New York release reporting list: Sulfuric acid Rhode Island RTK hazardous substances: Sulfuric acid Pennsylvania RTK: Sulfuric acid Minnesota: Sulfuric acid Massachusetts RTK: Sulfuric acid New Jersey: Sulfuric acid California Director's List of Hazardous Substances (8 CCR 339): Sulfuric acid Tennessee RTK: Sulfuric acid TSCA 8(b) inventory: Sulfuric acid SARA 302/304/311/312 extremely hazardous substances: Sulfuric acid SARA 313 toxic chemical notification and release reporting: Sulfuric acid CERCLA: Hazardous substances.: Sulfuric acid: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R35- Causes severe burns. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S30- Never add water to this product. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 2

Personal Protection:

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

Health: 3

Flammability: 0

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References:
-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

Other Special Considerations: Not available.

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Material Safety Data Sheet

LUMINOL ™ TR (Type I Trace-Inhibited)

1 . Product and company identification

Product name : LUMINOL ™ TR (Type I Trace-Inhibited)

Code : LUMTR

Material uses : Premium trace-inhibited (Type I) insulating oil for use in electrical transformers, circuit breakers and switches.

Manufacturer : Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga, Ontario
Canada L5J 1K2

In case of emergency : Suncor Energy: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Viscous liquid.

Odour : Slight naphthalene like odour.

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

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Emergency overview : No specific hazard.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin : Slightly irritating to the skin.

Eyes : Slightly irritating to the eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
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.

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

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4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : May be combustible at high temperature.

Extinguishing media

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

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), hydrocarbons, 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.

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6 . Accidental release measures

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

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	**ACGIH TLV (United States). Notes: (Mineral oil)** TWA: 5 mg/m³, (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: nitrile, neoprene, 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.

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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: 170°C (338°F) [Cleveland.]

Auto-ignition temperature : Not available.

Flammable limits : Not available.

Colour : Clear and bright

Odour : Slight naphthalene like odour.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : Not available.

Melting/freezing point : Not available.

Relative density : 0.84 kg/L @ 15°C (59°F)

Vapour pressure : Not available.

Vapour density : Not available.

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : 9.4 cSt @ 40°C (104°F), 2.6 cSt @ 100°C (212°F)

Pour point : -60°C (-76°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 and acids.

Hazardous decomposition products : May release COx, NOx, SOx, hydrocarbons, 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 Dusts and mists	Rat	>5.2 mg/l	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

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11 . Toxicological information

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

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

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : This product is inherently biodegradable.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

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

13 . Disposal considerations

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

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

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

14 . Transport information

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

PG* : Packing group

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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

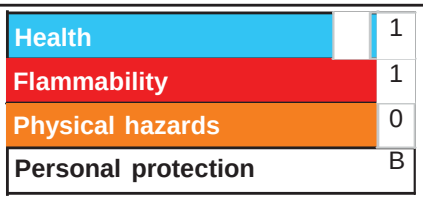
Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

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



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



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

Date of printing : **2/8/2012.**

Date of issue : 8 February 2012

Date of previous issue : No previous validation.

Responsible name : **Product Safety - JDW**

Indicates information that has changed from previously issued version.

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

Internet: lubricants.petro-canada.ca/msds

Lubricants:
Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518
Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285

For Product Safety Information: (905) 804-4752

Notice to reader

16 . Other information

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

Preparation Date: 31-Jul-2006 Revision Date: 24-Aug-2009 Revision Number: 1

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Supplier(s):

Orica Canada Inc.	Orica USA Inc.
Maple Street	33101 E. Quincy Avenue
Brownsburg, QC	Watkins, CO 80137-9406
For MSDS Requests: 1-450-533-4201	For MSDS Requests: 1-303-268-5000

Product Name:	Fortan™ Advantage, Fortis™ Advantage & Fortis™ Advantage ANE (USA)
Product Code:	2310
Alternate Name(s):	ApexM Clear
UN-No:	UN3139
Recommended Use:	Can be sensitized to become a booster sensitive emulsion explosive.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL: THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.: FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF 1-800-800-3855. FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 - HAZARD IDENTIFICATION

Emergency Overview:
May cause skin irritation and/or dermatitis. Irritating to eyes. Harmful if swallowed. Oxidizing agent. May cause methemoglobinemia. May cause liver damage. May cause kidney damage.

Appearance:	Physical State:	Odor:
Opaque, viscous liquid	Viscous, liquid	Vinegar

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %
Ammonium Nitrate	6484-52-2	60-75
Mineral Oil	64742-53-6	1-6
Diesel Fuel Oil	68476-34-6	1-6

SECTION 4 - FIRST AID MEASURES

General Advice:	In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the product label where possible).
Eye Contact:	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.
Skin Contact:	Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.
Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Ingestion:	Immediate medical attention is required. Do no induce vomiting. Clean mouth with water and afterwards drink plenty of water. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Never give anything by mouth to and unconscious person.
Notes to physician:	Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

SECTION 5 - FIRE-FIGHTING MEASURES

Flammable properties:	Not itself combustible but assists fire in burning materials. The product does not flash. Rate of burning: attempts to smother a fire involving this product will be ineffective as it is its own oxygen source.
Suitable extinguishing media:	Use Water only, in as much volume as possible to cool the burning mass quickly. Chemical extinguishers will not work. Fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.
Unsuitable extinguishing media:	Chemical extinguishers will not work. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.
Specific hazards arising from the chemical:	Toxic gases and vapours will be released by the thermal decomposition of this material. At higher temperatures, decomposition may be explosive, especially if confined. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry.
Protective equipment and precautions for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Methods for containment:	Contain or absorb leaking liquid with sand or earth or other suitable substance.
Methods for cleaning up:	Avoid the use of metal tools containing iron and/or copper. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or disposal. For release to land, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water, and absorbent for proper disposal. Notify applicable government authority if release is reportable or could adversely affect the environment.
Other information:	Deactivating chemicals: Detergents will break up emulsions if mixed in.

SECTION 7 - HANDLING AND STORAGE

Handling:	Avoid contact with eyes or skin. Wash thoroughly with soap and water after handling. Wash clothing before re-use. Locate safety shower and eyewash station closest to chemical handling area. The use of coveralls is recommended. Use good industrial hygiene and housekeeping practices. Keep away from open flames, hot surfaces and sources of ignition
Storage:	Store in a cool, well-ventilated area. Keep away from heat, sparks, and flames. Keep storage containers closed. Store at 10-27℃ (50-80℉). Do not expose closed containers to temperatures above 40℃ (104℉). Product is mildly corrosive to concrete and steel. Stainless steel and aluminium are adequate. Avoid materials made of copper, iron, or bronze.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Mineral oil	5 mg/m3	5 mg/ m3	
Diesel Fuel	TWA: 100 mg/m3 Skin		

Other exposure guidelines:	Ammonium Nitrate: ORICA Guideline 5 mg/m^3 (internal TWA)
Engineering Measures:	No information available.
Personal Protective Equipment	
Eye/Face Protection:	Tightly fitting safety goggles.
Skin Protection:	User should verify impermeability under normal conditions of use prior to general use. Impervious butyl rubber gloves.
Respiratory Protection:	In case of insufficient ventilation wear suitable respiratory equipment. A NIOSH-approved respirator, if required.
Hygiene Measures:	Handle in accordance with good industrial hygiene and safety practice. Recommendations listed in this section indicate the type of equipment, which will provide protection against over

exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Opaque, viscous liquid	Odor:	Vinegar
Physical State:	Viscous, liquid	Viscosity:	No information available
pH:	3 - 6	Flash Point:	Not applicable
Autoignition Temperature:	230-265℃/ 446-509℉	Boiling Point/Range:	None
Melting Point/Range:	Not available	Flammable Limits (Upper):	Not applicable
Flammable Limits (Lower):	Not applicable	Explosion Power:	No data available
Specific Gravity:	1.20 - 1.35 g/cc	Water Solubility:	Slightly soluble
Other Solubility:	Slightly soluble in standard organic solvents.	Vapor Pressure:	0 mmHg @ 20℃
Oxidizing Properties:	Oxidizer	Partition Coefficient (n-octanol/water):	No data available

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable under normal conditions. Decomposition Temperature: Ammonium Nitrate will spontaneously decompose at 210℃ (410℉).

Conditions to avoid: Keep away from open flames, hot surfaces and sources of ignition. Not expected to be sensitive to static discharge. Not expected to be sensitive to mechanical impact.

Incompatible materials: Avoid oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents.

Hazardous decomposition products: The following toxic decomposition products may be released. At temperatures above 210℃ (410℉), decomposition may be explosive, especially if confined. Nitrogen oxides (NOx). Carbon oxide. Hydrocarbons.

Hazardous Polymerization: None under normal processing. Hazardous polymerization does not occur. Explosive material under shock conditions.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information: Irritating to eyes. May cause skin irritation. Harmful if swallowed.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium Nitrate	2217 mg/kg Rat	3000 mg/kg Rabbit	88.8 mg/L Rat 4 h
Mineral Oil	4300 mg/kg Rat		
Diesel Fuel	>5000 mg/kg (rabbit)		

Subchronic Toxicity (28 Days): Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.

Chronic Toxicity: May cause methemoglobinemia.

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical name	ACGIH	IARC	NTP	OSHA
Diesel Fuel	A3			

Legend: A3: Confirmed as an animal carcinogen.

Mutagenic effects: There is no evidence of mutagenic potential.

Irritation: Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.

Reproductive effects: No information is available and no adverse reproductive effects are anticipated.

Developmental effects: No information is available and no adverse developmental effects are anticipated.

Target Organ: Eyes, skin, respiratory system, blood, liver, urinary tract, gastrointestinal tract (GI), endocrine system, & immune system.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity effects: Dissolves slowly in water. Harmful to aquatic life at low concentrations.
Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Persistence/Degradability: Some water resistance but soluble with extended time periods.

Mobility in Environmental media: Dissolves slowly in water.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Method: Burn under supervision of an expert at an explosive burning ground or destroy by detonation in boreholes, in accordance with applicable local, provincial and federal regulations. Call upon the services of an Orica Technical Representative.

SECTION 14 - TRANSPORT INFORMATION

DOT Proper Shipping Name: Oxidizing substance, liquid, N.O.S. (Ammonium Nitrate)
Hazard Class: 5.1
UN-No: UN3139
Packing group: II

Transportation Emergency Telephone Number: 1-877-561-3636 or CHEMTREC: 1-800-424-9300

SECTION 15 - REGULATORY INFORMATION

USA CLASSIFICATION:
SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2).
SARA 311/312 Hazardous Categorization

Acute Heath Hazard:	Yes
Chronic Health Hazard:	Yes
Fire Hazard:	Yes
Reactive Hazard:	No
Sudden Release of Pressure Hazard:	Yes

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents
Other Regulations/Legislations which apply to this product: New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

TSCA: Complies DSL: Complies NDSL: Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X
Mineral Oil	X	X	-	-	X	-	X	X	X	X
Diesel Fuel	X	X	-	-	X	-	X	X	X	X

Legend: X - Listed

SECTION 16 - OTHER INFORMATION

Prepared by: Safety Health & Environment
303-268-5000

Preparation Date: 31-Jul-2006
Revision Date: 24-Aug-2009

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS

Safety Data Sheet

The Armor All/STP Products Company
44 Old Ridgebury Road
Suite 300
Danbury, CT 06810
Tel. 1-203-205-2900

1. Product And Company Identification

Product Name: ARMOR ALL® Original Protectant

Responsible Party: The Armor All/STP Products Company
44 Old Ridgebury Road
Suite 300
Danbury, CT 06810

Information Phone Number: +1 203-205-2900
Emergency Phone Number:
For Medical Emergencies, call 1-866-949-6465 / +1 303-389-1332 (Outside US and Canada)
For Transportation Emergencies, call 1-800-424-9300 (Chemtrec) +1-703-527-3887 for Outside US and Canada (call collect)
SDS Date Of Preparation: 01/31/2015
Product Use and Uses Advised Against: Automotive maintenance product – For consumer and professional use

2. Hazards Identification

Note: This product is a consumer product and is labeled in accordance with the Consumer Product Safety Commission regulations and not OSHA regulations. The requirements for the labeling of consumer products take precedence over OSHA labeling so the actual product label will differ from the OSHA information shown below.

GHS Classification:

Physical:	**Health:**
Not Hazardous	Not Hazardous

GHS Label Elements: None

Hazards not otherwise specified: None

Percentage of unknown toxicity: N/a

3. Composition/Information On Ingredients

Component	**CAS No.**	**Amount**
Non-Hazardous Ingredients	Mixture	95> - 100%
Mineral Oil	8042-47-5	< 5%

The specific identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

4. First Aid Measures

Inhalation: If symptoms of exposure develop, remove to fresh air. Seek medical attention if symptoms persist.

Skin Contact: Rinse skin with plenty of water. If skin irritation or redness develops, seek medical attention.

Eye Contact: Flush eyes with plenty of water. If irritation or other symptoms persist, seek medical attention.

Ingestion: Do not induce vomiting unless directed to by doctor or physician. If the victim is fully conscious, have them drink a glass of water. Get medical assistance by calling a doctor or poison center. Never give anything by mouth to a person who is unconscious or drowsy.

Most Important Symptoms: Direct eye contact may cause mild irritation.

Indication of Immediate Medical Attention/Special Treatment: Immediate medical attention should not be required.

5. Firefighting Measures

Suitable (and Unsuitable) Extinguishing Media: Use dry chemical, carbon dioxide, foam, or water spray.

Specific Hazards Arising from the Chemical: Closed containers may rupture if exposed to extreme heat. Thermal decomposition will generate oxides of carbon and silicon and formaldehyde.

Special Protective Equipment and Precautions for Fire-fighters: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing for fires in areas where chemicals are used or stored.

6: Accidental Release Measures

Personal Precautions, Protective Equipment, and Emergency Procedures: Wear appropriate protective equipment.

Environmental Precautions: Prevent entry in storm sewers and waterways. Report spill as required by local and national regulations.

Methods for Containment and Clean-Up: Absorb with an inert material. Collect into a suitable container for disposal. Rinse area with water.

7. Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes. Avoid prolonged contact with skin and clothing. Wash hands after use. Keep out of the reach of children.

Conditions for Safe Storage, Including any Incompatibilities: No special storage required.

8. Exposure Controls / Personal Protection

Exposure Guidelines:

CHEMICAL	EXPOSURE LIMIT
Non-Hazardous Ingredients	None Established
Mineral Oil	5.0 mg/m3 inhalable TWA ACGIH TLV 5.0 mg/m3 TWA OSHA PEL

Engineering Controls: General ventilation should be adequate for all normal use.

Personal Protective Equipment

Respiratory Protection: None required under normal use conditions.

Gloves: None required under normal use conditions.

Eye Protection: None required for normal use. Avoid eye contact.

Other Protective Equipment/Clothing: None required under normal use conditions.

9. Physical and Chemical Properties

Appearance and Odor: Opaque, white viscous liquid with a slight odor.

Physical State: Liquid	**Odor Threshold:** Not available
pH: 7.5 - 9.0	**Specific Gravity:** ~1
Initial Boiling Point/Range: Not determined	**Vapor Pressure:** Not determined
Melting/Freezing Point: Not determined	**Vapor Density:** Not determined
Solubility In Water: Easily soluble	**Percent Volatile:** >80%
Viscosity: ~ 3,000 cP	**Evaporation Rate:** Not determined
Coefficient Of Water/Oil Distribution: Not determined	**VOC Content:** Not determined
Flash Point: >212°F (>100°C)	**Autoignition Temp:** Not determined
Decomposition Temperature: Not determined	**Flammability Limits:** LEL: Not determined UEL: Not determined
Flammability (solid, gas): Not applicable	

10. Stability and Reactivity

Reactivity: Not normally reactive
Chemical Stability: Stable.
Possibility of Hazardous Reactions: None known
Conditions To Avoid: None known
Incompatible Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Thermal decomposition will generate oxides of carbon, silicon dioxide, and formaldehyde.

11. Toxicological Information

POTENTIAL HEALTH EFFECTS:

Acute Hazards:

Inhalation: No adverse effects expected from the normal use of this product.

Skin Contact: No adverse effects expected from the normal use of this product.

Eye Contact: Direct contact may cause slight eye irritation.

Ingestion: Swallowing may cause gastrointestinal disturbances.

Chronic Hazards: None currently known.

Carcinogenicity Listing: None of the components is listed as a carcinogen or potential carcinogen by IARC, NTP, ACGIH or OSHA.

Acute Toxicity Values:

No data available for product.
Mineral Oil: LD50 Rat oral > 5,000 mg/kg
LD50 Rabbit dermal > 2,000 mg/ kg
LC50 Rat inhalation > 5,000 mg/L/4 hr.

12. Ecological Information

Ecotoxicity:
No ecotoxicity data is currently available for product.
Mineral Oil: NOEL Oncorhynchus mykiss >= 100 mg/L/96 hr.
NOEL Daphnia magna>= 100 mg/L/96 hr.

Persistence and Degradability: No data available

Bio accumulative Potential: No data available

Mobility in Soil: No data available

Other Adverse Effects: No data available

13. Disposal Considerations

Dispose of in accordance with all local, state/provincial and federal regulations. Offer empty containers for recycling.

14. Transport Information

DOT Hazardous Materials Description: Not Regulated

Canadian TDG Hazardous Materials Description: Not Regulated

IMDG Dangerous Goods Description: Not Regulated

15. Regulatory Information

United States:

EPA TSCA INVENTORY: All of the components of this material are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

The Armor All/STP Products Company
44 Old Ridgebury Road
Suite 300
Danbury, CT 06810
Tel. 1-203-205-2900

CERCLA Section 103: This product has no RQ, however, oil spills must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

SARA Hazard Category (311/312): Not hazardous

SARA 313: This product contains the following chemicals subject to Annual Release Reporting Requirements Under SARA Title III, Section 313 (40 CFR 372): None

Canada:

Canadian WHMIS Classification: Not a controlled product.

Canadian Environmental Protection Act: All of the ingredients are listed on the Canadian DSL.

This SDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the SDS contains all of the information required by the CPR.

16. Other Information

NFPA Rating (NFPA 704):	Health: 0	Fire: 0	Instability: 0
HMIS Rating:	Health: 0	Fire: 0	Physical Hazard: 0

REVISION SUMMARY: January 31, 2015 Update to GHS SDS format and name change: Changes to all sections.

DATA SUPPLIED IS FOR USE ONLY IN CONNECTION WITH OCCUPATIONAL SAFETY AND HEALTH

SAFETY DATA SHEET

PETRO-CANADA ATF D3M

000003001076

Version 5.1 Revision Date 2017/01/27 Print Date 2017/02/03

SECTION 1. IDENTIFICATION

Product name	:	PETRO-CANADA ATF D3M
Synonyms	:	RDL 2746
Product code	:	ATFD3MP5R, ATFD3MP20, ATFD3MICT, ATFD3MIBC, ATFD3MDRR, ATFD3MDRM, ATFD3MDCT, ATFD3MC12, ATFD3M, ATFD3MBLK
Manufacturer or supplier's details		Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga ON L5J 1K2 Canada
Emergency telephone number		Petro-Canada Lubricants Inc.: +1 905-403-5770; CHEMTREC Transport Emergency: 1-800-424-9300; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Automatic transmission fluid for most North American automobiles and for off-highway torque converters requiring C-4 type transmission fluid. It is also suitable as a hydraulic fluid and as a top-up in power steering systems. Not to be used in conditions where aerosols could be generated.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	dark red
Odour	Mild petroleum oil like.

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion

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Inhalation
Skin contact

Aggravated Medical Condition : None known.

Other hazards

None known.

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
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based	72623-87-1	30 - 50 %
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	40 - 60 %
Methacrylate copolymers		1 - 3 %

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.

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DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.

Most important symptoms and effects, both acute and delayed : First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : No information available.

Specific hazards during firefighting : Cool closed containers exposed to fire with water spray.

Hazardous combustion products : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), phosphorus oxides (POx), hydrocarbons, smoke and irritating vapours as products of incomplete combustion.

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

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

Environmental precautions : Do not allow uncontrolled discharge of product into the environment.

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

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.

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Use only with adequate ventilation.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid contact with skin, eyes and clothing.
Do not ingest.
Keep away from heat and sources of ignition.
Keep container closed when not in use.

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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based	72623-87-1	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH
lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based	72623-86-0	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH

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.

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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.
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	:	dark red
Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	-51 °C (-60 °F)
Boiling point/boiling range	:	No data available
Flash point	:	185 °C (365 °F) Method: Cleveland open cup
Fire Point	:	205 °C (401 °F)
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

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Vapour pressure	:	No data available
Relative vapour density	:	No data available
Density	:	0.855 kg/l (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	34.26 cSt (40 °C / 104 °F)
		7.7 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, reducing agents and acids.
Hazardous decomposition products	:	May release COx, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	Remarks: No data available
Acute dermal toxicity	:	Assessment: The substance or mixture has no acute dermal toxicity

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Components:

lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 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

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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 product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

Not regulated as a dangerous good

IMDG-Code

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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.

National Regulations

TDG

Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

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

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

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

SECTION 16. OTHER INFORMATION

For Copy of SDS : Internet: lubricants.petro-canada.com/sds
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

Revision Date : 2017/01/27

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.

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Brake Fluid DOT 3

SECTION 1. IDENTIFICATION

Product Identifier	Brake Fluid DOT 3
Other Means of Identification	15-810, 15-811, 15-813, 15-814, 15-818, 35-810AS, 35-810CQ, 35-810PC, 35-810PRES, 35-811AS, 35-811CQ, 35-811PRES, 35-811SO, 35-811WM, 35-813AS, 35-813CQ, 35-813SO, 35-813WM, 35-814AS, 35-814CQ, 35-814PRES, 35-814SO, 35-816C, 35-818AS, 35-818CQ, 85-818
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	1515
Date of Preparation	August 11, 2015

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) - Category 4; Acute toxicity (Dermal) - Category 4; Serious eye damage/eye irritation - Category 2A; Reproductive Toxicity - Category 2

GHS Label Elements



Signal Word:
Warning

Hazard Statement(s):

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
H361	Suspected of damaging fertility or the unborn child if inhaled, following skin contact and/or if swallowed.

Precautionary Statement(s):

Prevention:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash hands and skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/protective clothing.

Response:

P301 + P312 IF SWALLOWED: Call a POISON CENTRE/doctor if you feel unwell.
P330 Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of 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 CENTRE/doctor if you feel unwell.
P321 Specific treatment (see supplemental first aid instruction on this label).
P337 + P313 If eye irritation persists: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.

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.

Note:

3-7
% of the mixture consists of ingredient(s) of unknown acute toxicity.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Diethylene glycol	111-46-6	10-30	
Poly(oxy-1,2-ethanediyl), alpha-butyl- omega -hydroxy-	9004-77-7	10-30	
3,6,9,12-Tetraoxahexadecan-1-ol	1559-34-8	7-13	
Diethylene glycol monobutyl ether	112-34-5	7-13	
Poly(oxy-1,2-ethanediyl), alpha-methyl-omega-hydroxy-	9004-74-4	3-7	
Diethylene glycol monoethyl ether	111-90-0	1-5	
Diethylene glycol monomethyl ether	111-77-3	1-5	

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

Inhalation

Remove source of exposure or move to fresh air. Get medical advice/attention 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). Rinse with lukewarm, gently flowing water for 5 minutes.

Eye Contact

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

Rinse mouth with water. Get medical advice/attention if you feel unwell or are concerned.

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

Special Instructions

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Not combustible. Use extinguishing agent suitable for surrounding fire.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Chemical

Does not burn.
In a fire, the following hazardous materials may be generated: toxic chemicals.

Special Protective Equipment and Precautions for Fire-fighters

Review Section 6 (Accidental Release Measures) for important information on responding to leaks/spills.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

No special precautions are necessary. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment. 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.

Other Information

Report spills to local health, safety and environmental authorities, as required.

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

	ACGIH TLV®		OSHA PEL		AIHA WEEL	
Chemical Name	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Diethylene glycol					10 mg/m3	
Diethylene glycol monobutyl ether	10 ppm					
Diethylene glycol monoethyl ether					25 ppm	

Appropriate Engineering Controls

General ventilation is usually adequate.

Individual Protection Measures

Eye/Face Protection

Not required but it is good practice to wear safety glasses or chemical safety goggles.

Skin Protection

Not required, if used as directed.

Respiratory Protection

Not normally required if product is used as directed.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light amber. Particle Size: Not applicable
Odour	Not available
Odour Threshold	Not available
pH	Not applicable
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	132 ºC (270 ºF) (closed cup)
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	< 0.013 kPa (0.098 mm Hg)
Vapour Density (air = 1)	Not available

Relative Density (water = 1)	1.038 - 1.040
Solubility	Practically insoluble in water
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State	Liquid
Molecular Formula	Not available
Molecular Weight	Not available
Surface Tension	Not available
Critical Temperature	Not available
Electrical Conductivity	Not available
Vapour Pressure at 50 deg C	Not available
Saturated Vapour Concentration	Not available

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Water, moisture or humidity.

Incompatible Materials

Slightly reactive or incompatible with the following materials: oxidizing agents (e.g. peroxides).

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; eye contact.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Diethylene glycol	4600 mg/m3 (rat) (30-minute exposure)	12565 mg/kg (rat)	11890 mg/kg (rabbit)
3,6,9, 12-Tetraoxahexadecan-1-ol	Not available	5300 mg/kg (rat)	
Diethylene glycol monobutyl ether		6560 mg/kg (rat)	2764 mg/kg (rabbit)
Poly(oxy-1,2-ethanediyl), alpha-methyl-omega-hydroxy-		39800 mg/kg (rat)	> 20000 mg/kg (rabbit)

Diethylene glycol monoethyl ether	5240 mg/m3 (rat)	10502 mg/kg (rat)	9143 mg/kg (rabbit)
Diethylene glycol monomethyl ether	> 50000 mg/m3 (rat) (4-hour exposure)	6830 mg/kg (rat)	9404 mg/kg (rabbit)
Poly(oxy-1,2-ethanediyl), alpha-butyl- omega -hydroxy-	Not available	Not available	Not available

LC50: Not applicable.

LD50 (oral): Not applicable.

LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

May cause mild irritation based on information for closely related chemicals.

Serious Eye Damage/Irritation

Causes serious eye damage based on skin corrosion information.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

No information was located.

Skin Absorption

No information was located.

Ingestion

May be harmful based on information for closely related materials. May cause depression of the central nervous system.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

No information was located.

Respiratory and/or Skin Sensitization

Not a respiratory sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Diethylene glycol	Not Listed	Not designated	Not Listed	Not Listed
3,6,9, 12-Tetraoxahexadecan-1-ol	Not Listed	Not designated	Not Listed	Not Listed
Diethylene glycol monobutyl ether	Not Listed	Not designated	Not Listed	Not Listed
Poly(oxy-1,2-ethanediyl), alpha-methyl-omega-hydroxy -	Not Listed	Not designated	Not Listed	Not Listed
Diethylene glycol monoethyl ether	Not Listed	Not designated	Not Listed	Not Listed
Diethylene glycol monomethyl ether	Not Listed	Not designated	Not Listed	Not Listed
Poly(oxy-1,2-ethanediyl), alpha-butyl- omega -hydroxy-	Not Listed	Not designated	Not Listed	Not Listed

Reproductive Toxicity

Development of Offspring

Not known to harm the unborn child.

Sexual Function and Fertility

May cause effects on sexual function and/or fertility based on limited evidence.

Effects on or via Lactation

Not known to cause effects on or via lactation.

Germ Cell Mutagenicity

No information was located.

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
Diethylene glycol	75200 mg/L (Pimephales promelas (fathead minnow); 96-hour; fresh water)	10000 mg/L (Daphnia magna (water flea); 48-hour)		Not available
3,6,9, 12-Tetraoxahexadecan-1-ol	2400 mg/L (Pimephales promelas (fathead minnow); 96-hour)	2210 mg/L (Daphnia magna (water flea); 48-hour)		
Diethylene glycol monobutyl ether	1300 mg/L (Lepomis macrochirus (bluegill); 96-hour)	100 mg/L (Daphnia magna (water flea); 48-hour)		
Poly(oxy-1,2-ethanediyl), alpha-methyl-omega-hydroxy-	10000 mg/L (Pimephales promelas (fathead minnow); 96-hour)	Not available		
Diethylene glycol monoethyl ether	9650 mg/L (Pimephales promelas (fathead minnow); 96-hour)			
Diethylene glycol monomethyl ether	5741 mg/L (Pimephales promelas (fathead minnow); 96-hour)	1191 mg/L (Daphnia magna (water flea); 48-hour)		
Poly(oxy-1,2-ethanediyl), alpha-butyl- omega -hydroxy-	Not available			

Chronic Aquatic Toxicity

Chemical Name	NOEC Fish	EC50 Fish	NOEC Crustacea	EC50 Crustacea
Diethylene glycol	Not available		Not available	Not available
3,6,9, 12-Tetraoxahexadecan-1-	Not available		Not available	

ol				
Diethylene glycol monobutyl ether	Not available		Not available	
Poly(oxy-1,2-ethanediyl), alpha-methyl-omega-hydroxy-	Not available		Not available	
Diethylene glycol monoethyl ether	Not available		Not available	
Diethylene glycol monomethyl ether	Not available		Not available	
Poly(oxy-1,2-ethanediyl), alpha-butyl- omega -hydroxy-	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

Not regulated under Canadian TDG Regulations. Not regulated under US DOT Regulations.

Environmental Hazards: Potential Marine Pollutant

Special Precautions for User: Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

SECTION 16. OTHER INFORMATION

SDS Prepared By: Compliance and Regulatory Department

Phone No.: 905-878-5544

Additional Information: We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative.
Please send us your request by visiting our website at www.recochem.com.

	Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.
Disclaimer	Notice to reader: To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

1. Identification

Product identifier **Brakleen® Brake Parts Cleaner - Non-Chlorinated**

Other means of identification

Product code 05088

Recommended use Brake parts cleaner

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufactured or sold by:

Company name CRC Industries, Inc.

Address 885 Louis Dr.
Warminster, PA 18974 US

Telephone

General Information 215-674-4300

Technical Assistance 800-521-3168

Customer Service 800-272-4620

24-Hour Emergency (CHEMTREC) 800-424-9300 (US)
703-527-3887 (International)

Website www.crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
	Gases under pressure	Compressed gas
Health hazards	Acute toxicity, oral	Category 3
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 1
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2
OSHA defined hazards	Not classified.	

Label elements



Signal word Danger

Hazard statement Extremely flammable aerosol. Contains gas under pressure; may explode if heated. Toxic if swallowed. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause drowsiness or dizziness. May cause damage to organs (liver, kidneys, lungs, brain) through prolonged or repeated exposure. Suspected of damaging the unborn child. Causes damage to organs (eyes) by ingestion. Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Do not apply while equipment is energized. Pressurized container: Do not pierce or burn, even after use. Extinguish all flames, pilot lights and heaters. Vapors will accumulate readily and may ignite. Do not breathe gas. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. If you experience any symptoms listed on this label, increase ventilation or leave the area. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection. Avoid release to the environment.

Response If swallowed: Immediately call a poison center/doctor. Rinse mouth. Do NOT induce vomiting. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical attention. Take off contaminated clothing and wash before reuse. 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. If eye irritation persists: Get medical attention. If exposed: Call a poison center/doctor. If exposed or concerned: Get medical attention. Collect spillage.

Storage Store in a well-ventilated place. Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Exposure to high temperature may cause can to burst.

Disposal Dispose of contents/container in accordance with local/regional/national regulations.

Hazard(s) not otherwise classified (HNOC) Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.

Supplemental information

16.8% of the mixture consists of component(s) of unknown acute oral toxicity. 66.2% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 62% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.
When exposed to extreme heat or hot surfaces, vapors may decompose to harmful or fatal corrosive gases such as formaldehyde.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Methanol		67-56-1	40 - 50
Toluene		108-88-3	10 - 20
Acetone		67-64-1	5 - 15
3-Methylhexane		589-34-4	5 - 10
Carbon dioxide		124-38-9	5 - 10
n-Heptane		142-82-5	5 - 10
Methylcyclohexane		108-87-2	3 - 5
Naphtha (petroleum), hydrotreated light		64742-49-0	3 - 5
Cyclohexane		110-82-7	1 - 3
Ethylbenzene		100-41-4	< 0.2

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms/effects, acute and delayed	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Irritation of nose and throat. Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Upper respiratory tract irritation. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. 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	Alcohol resistant foam. Water fog. Carbon dioxide (CO2). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Contents under pressure. Pressurized container may rupture when exposed to heat or flame. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire-fighting equipment/instructions	In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.
General fire hazards	Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Remove all possible sources of ignition in the surrounding area. Many vapors are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not breathe gas. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. This product is miscible in water. Stop the flow of material, if this is without risk. Prevent product from entering drains. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases. Use appropriate containment to avoid environmental contamination.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Use caution around energized equipment. The metal container will conduct electricity if it contacts a live source. This may result in injury to the user from electrical shock and/or flash fire. Do not breathe mist or vapor. Do not breathe gas. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices. Avoid release to the environment. For product usage instructions, please see the product label.

Conditions for safe storage, including any incompatibilities

Level 3 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Avoid spark promoters. These alone may be insufficient to remove static electricity. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Acetone (CAS 67-64-1)	PEL	2400 mg/m3 1000 ppm
Carbon dioxide (CAS 124-38-9)	PEL	9000 mg/m3 5000 ppm
Cyclohexane (CAS 110-82-7)	PEL	1050 mg/m3 300 ppm
Ethylbenzene (CAS 100-41-4)	PEL	435 mg/m3 100 ppm
Methanol (CAS 67-56-1)	PEL	260 mg/m3 200 ppm
Methylcyclohexane (CAS 108-87-2)	PEL	2000 mg/m3 500 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3 500 ppm

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Toluene (CAS 108-88-3)	Ceiling TWA	300 ppm 200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
3-Methylhexane (CAS 589-34-4)	STEL TWA	500 ppm 400 ppm
Acetone (CAS 67-64-1)	STEL TWA	500 ppm 250 ppm
Carbon dioxide (CAS 124-38-9)	STEL TWA	30000 ppm 5000 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Cyclohexane (CAS 110-82-7)	TWA	100 ppm
Ethylbenzene (CAS 100-41-4)	TWA	20 ppm
Methanol (CAS 67-56-1)	STEL	250 ppm
	TWA	200 ppm
Methylcyclohexane (CAS 108-87-2)	STEL	500 ppm
	TWA	400 ppm
n-Heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
Toluene (CAS 108-88-3)	TWA	20 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Acetone (CAS 67-64-1)	TWA	590 mg/m3
		250 ppm
Carbon dioxide (CAS 124-38-9)	STEL	54000 mg/m3
		30000 ppm
	TWA	9000 mg/m3
		5000 ppm
Cyclohexane (CAS 110-82-7)	TWA	1050 mg/m3
		300 ppm
Ethylbenzene (CAS 100-41-4)	STEL	545 mg/m3
		125 ppm
	TWA	435 mg/m3
		100 ppm
Methanol (CAS 67-56-1)	STEL	325 mg/m3
		250 ppm
	TWA	260 mg/m3
		200 ppm
Methylcyclohexane (CAS 108-87-2)	TWA	1600 mg/m3
		400 ppm
n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3
		440 ppm
	TWA	350 mg/m3
		85 ppm
Toluene (CAS 108-88-3)	STEL	560 mg/m3
		150 ppm
	TWA	375 mg/m3
		100 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Acetone (CAS 67-64-1)	25 mg/l	Acetone	Urine	*
Ethylbenzene (CAS 100-41-4)	0.15 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*
Methanol (CAS 67-56-1)	15 mg/l	Methanol	Urine	*
Toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
	0.02 mg/l	Toluene	Blood	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.
Toluene (CAS 108-88-3) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Methanol (CAS 67-56-1) Skin designation applies.
Toluene (CAS 108-88-3) Skin designation applies.

US - Tennessee OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US NIOSH Pocket Guide to Chemical Hazards: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

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. Eye wash facilities and emergency shower should be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Neoprene. Polyvinyl alcohol (PVA).

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using do not smoke. Keep away from food and drink. 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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Aerosol.

Color Clear.

Odor Solvent.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -195.9 °F (-126.6 °C) estimated

Initial boiling point and boiling range 132.9 °F (56.1 °C) estimated

Flash point 0 °F (-17.8 °C) Tag Closed Cup

Evaporation rate Fast.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 1 % estimated

Flammability limit - upper (%)	36 % estimated
Vapor pressure	4438 hPa estimated
Vapor density	> 1 (air = 1)
Relative density	0.84 estimated
Solubility (water)	Slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	539.6 °F (282 °C) estimated
Decomposition temperature	Not available.
Viscosity (kinematic)	Not available.
Percent volatile	92.4 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Contact with incompatible materials. When exposed to extreme heat or hot surfaces, vapors may decompose to harmful or fatal corrosive gases such as formaldehyde.
Incompatible materials	Acids. Alkalies. Reducing agents. Strong oxidizing agents. Hypochlorites. Peroxides. Aluminum. Magnesium. Sodium. Zinc.
Hazardous decomposition products	Carbon oxides. Formaldehyde.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause damage to organs through prolonged or repeated exposure by inhalation. May cause drowsiness and dizziness. Headache. Nausea, vomiting.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	Toxic if swallowed. Even small amounts (30-250 ml methanol) may be fatal. Symptoms are stomach ache, nausea, vomiting, dullness, visual disorder and blindness. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Headache. May cause drowsiness and dizziness. Nausea, vomiting. Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Narcotic effects.

Product	Species	Test Results
Brakleen® Brake Parts Cleaner - Non-Chlorinated		
Acute		
Dermal		
LD50	Rabbit	6702 mg/kg estimated
Inhalation		
LC50	Rat	58 mg/l, 4 Hours estimated
Oral		
LD50	Human	110 mg/kg estimated
	Rat	5943 mg/kg estimated

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Based on available data, the classification criteria are not met.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not available.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

Reproductive toxicity Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure Causes damage to organs (eyes) by ingestion. May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure May cause damage to organs through prolonged or repeated exposure: Liver. Kidneys. Lungs. Brain.

Aspiration hazard May be fatal if swallowed and enters airways. If aspirated into lungs during swallowing or vomiting, may cause chemical pneumonia, pulmonary injury or death.

Chronic effects May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Acetone (CAS 67-64-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	10294 - 17704 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	4740 - 6330 mg/l, 96 hours
Cyclohexane (CAS 110-82-7)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	23.03 - 42.07 mg/l, 96 hours
Ethylbenzene (CAS 100-41-4)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	2.1 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	12.1 mg/l, 96 hours
Methanol (CAS 67-56-1)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	18000 - 20000 mg/l, 96 hours
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	> 10000 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	18000 - 20000 mg/l, 96 hours
Methylcyclohexane (CAS 108-87-2)			
Aquatic			
Fish	LC50	Striped bass (Morone saxatilis)	5.8 mg/l, 96 hours
n-Heptane (CAS 142-82-5)			
Aquatic			
Acute			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.1 - 2.98 mg/l, 96 hours
Toluene (CAS 108-88-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	5.46 - 9.83 mg/l, 48 hours

Components		Species	Test Results
Fish	LC50	Coho salmon,silver salmon (Oncorhynchus kisutch)	8.11 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Acetone	-0.24
Cyclohexane	3.44
Ethylbenzene	3.15
Methanol	-0.77
Methylcyclohexane	3.61
n-Heptane	4.66
Toluene	2.73

Mobility in soil No data available.

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 of waste from residues / unused products This material and its container must be disposed of as hazardous waste. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate or crush. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F
F005: Waste Non-halogenated Solvent - Spent Non-halogenated Solvent

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1950
UN proper shipping name Aerosols, flammable, Limited Quantity
Transport hazard class(es)
Class 2.1
Subsidiary risk 6.1(PGIII)
Label(s) 2.1
Packing group Not applicable.
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions N82
Packaging exceptions 306
Packaging non bulk None
Packaging bulk None

IATA

UN number UN1950
UN proper shipping name Aerosols, flammable, containing substances in Division 6.1, Packing Group III
Transport hazard class(es)
Class 2.1
Subsidiary risk 6.1(PGIII)
Packing group Not applicable.
Environmental hazards No.
ERG Code 10P
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Other information
Passenger and cargo aircraft Allowed with restrictions.
Cargo aircraft only Allowed with restrictions.

IMDG

UN number	UN1950
UN proper shipping name	AEROSOLS
Transport hazard class(es)	
Class	2
Subsidiary risk	6.1(PGIII)
Packing group	Not applicable.
Environmental hazards	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

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

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

SARA 304 Emergency release notification

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Cyclohexane (CAS 110-82-7)
Ethylbenzene (CAS 100-41-4)
Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)

CERCLA Hazardous Substance List (40 CFR 302.4)

Acetone (CAS 67-64-1)
Cyclohexane (CAS 110-82-7)
Ethylbenzene (CAS 100-41-4)
Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)

CERCLA Hazardous Substances: Reportable quantity

Acetone (CAS 67-64-1)	5000 LBS
Cyclohexane (CAS 110-82-7)	1000 LBS
Ethylbenzene (CAS 100-41-4)	1000 LBS
Methanol (CAS 67-56-1)	5000 LBS
Toluene (CAS 108-88-3)	1000 LBS

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

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

Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)

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

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Acetone (CAS 67-64-1)	6532
Toluene (CAS 108-88-3)	6594

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Acetone (CAS 67-64-1)	35 %WV
Toluene (CAS 108-88-3)	35 %WV

DEA Exempt Chemical Mixtures Code Number

Acetone (CAS 67-64-1)	6532
Toluene (CAS 108-88-3)	594

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Acetone (CAS 67-64-1)	Low priority

Food and Drug Administration (FDA)	Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - Yes Reactivity Hazard - No
SARA 302 Extremely hazardous substance	No

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Acetone (CAS 67-64-1)
Ethylbenzene (CAS 100-41-4)
Methanol (CAS 67-56-1)
Naphtha (petroleum), hydrotreated light (CAS 64742-49-0)
Toluene (CAS 108-88-3)

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

3-Methylhexane (CAS 589-34-4)
Acetone (CAS 67-64-1)
Carbon dioxide (CAS 124-38-9)
Methylcyclohexane (CAS 108-87-2)
n-Heptane (CAS 142-82-5)

US. Massachusetts RTK - Substance List

3-Methylhexane (CAS 589-34-4)
Acetone (CAS 67-64-1)
Carbon dioxide (CAS 124-38-9)
Cyclohexane (CAS 110-82-7)
Methanol (CAS 67-56-1)
Methylcyclohexane (CAS 108-87-2)
n-Heptane (CAS 142-82-5)
Toluene (CAS 108-88-3)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Rhode Island RTK

Acetone (CAS 67-64-1)
Cyclohexane (CAS 110-82-7)
Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)

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

Cyclohexane (CAS 110-82-7)
Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Acetone (CAS 67-64-1)
Cyclohexane (CAS 110-82-7)
Methanol (CAS 67-56-1)
Toluene (CAS 108-88-3)
Benzene (CAS 71-43-2)
Ethylbenzene (CAS 100-41-4)
Xylene (CAS 1330-20-7)
3-Methylhexane (CAS 589-34-4)
Carbon dioxide (CAS 124-38-9)
Methylcyclohexane (CAS 108-87-2)
n-Heptane (CAS 142-82-5)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Benzene (CAS 71-43-2)	Listed: February 27, 1987
Cumene (CAS 98-82-8)	Listed: April 6, 2010

Ethanal (CAS 75-07-0)	Listed: April 1, 1988
Ethylbenzene (CAS 100-41-4)	Listed: June 11, 2004
Naphthalene (CAS 91-20-3)	Listed: April 19, 2002

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997
Methanol (CAS 67-56-1)	Listed: March 16, 2012
Toluene (CAS 108-88-3)	Listed: January 1, 1991

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997

Volatile organic compounds (VOC) regulations

EPA

VOC content (40 CFR 51.100(s))	84 %
Consumer products (40 CFR 59, Subpt. C)	Not regulated

State

Consumer products	This product is regulated as a Brake Cleaner. This product is not compliant to be sold for use in California, Connecticut, Delaware, the District of Columbia, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island and parts of Utah and Virginia.
VOC content (CA)	84 %
VOC content (OTC)	84 %

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
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 revision

Issue date	05-13-2015
Revision date	01-13-2016
Prepared by	Allison Cho
Version #	02
Further information	CRC # 483A
HMIS® ratings	Health: 3* Flammability: 4 Physical hazard: 0 Personal protection: B
NFPA ratings	Health: 3 Flammability: 4 Instability: 0

NFPA ratings



Disclaimer

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Industries.

JELMAR
MATERIAL SAFETY DATA SHEET
CLR CALCIUM LIME & RUST REMOVER
ENHANCED FORMULA

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: Jelmar
Address: 5550 W. Touhy Ave.
Skokie, IL 60077

Emergency Phone Number: 1(800) 323-5497 (USA)
Monday – Friday 8:30 A.M. – 4:30 P.M. CST
Emergency Contact: Chemtrec 1(800) 424-9300

Product Name: CLR Calcium Lime & Rust Remover (Enhanced Formula)
MSDS ID: 031004
Chemical Family: Aqueous Acidic Cleaner
Formula: Proprietary Mixture

SECTION 2 – HAZARDS IDENTIFICATION

PHYSICAL STATE: Liquid
COLOR: Crystal clear, lime green
ODOR: Slightly sour

WARNING OVERVIEW: Irritating to eyes, skin, respiratory tract and mucous membranes. Risk of burns to eyes, skin, and respiratory tract. May be harmful or fatal if swallowed. Use with adequate ventilation. Avoid breathing mist or dust. Keep container closed when not in use.

POTENTIAL HEALTH EFFECTS
ROUTES OF EXPOSURE: Eyes. Skin. Inhalation. Ingestion.
TARGET ORGANS: No data.
EYE CONTACT: Severe irritation and blurred vision. Effects may vary depending on length of exposure, solution concentration, and first aid measures. Prolonged contact may cause permanent damage.
SKIN CONTACT: Causes skin irritation. Prolonged contact may cause dermatitis, and itching.
INHALATION: Irritation, breathing difficulties, headaches, dizziness.
INGESTION: Oral burns, vomiting, and gastrointestinal disturbance.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE TO PRODUCT: Eye, skin, and respiratory disorders.
CANCER INFORMATION: This product does not contain >0.10% of the known potential carcinogens listed in NTP, IRAC, or OSHA.

DO NOT MIX WITH BLEACH, OR ANY OTHER PRODUCT AS TOXIC FUMES MAY RESULT. KEEP OUT OF REACH OF CHILDREN.

SECTION 3 - COMPOSITION /INFORMATION ON INGREDIENTS

Component	CAS#	Osha Hazard	% by Weight
1. Water	7732-18-5	NO	70-81
2. Lactic Acid	79-33-4	YES	15-20
3. Gluconic Acid	526-95-4	N0	2-4
4. Lauryldimethyl Hydroxysultaine	13197-76-7	N0	1-4
5. Propylene Glycol Normal Butyl Ether	5131-66-8	YES	1-2

SECTION 4 – FIRST AID MEASURES

EYE CONTACT: In case of eye contact, immediately rinse eye thoroughly with plenty of water. Remove contact lenses, and continue rinsing for at least 15 minutes. Get immediate medical attention.

SKIN CONTACT: Can be irritating to skin, prolonged contact can be more severe, no adverse effects during normal usage. In case of skin contact, rinse area for at least 15 minutes. Remove contaminated clothing and shoes, wash thoroughly before reuse. Get immediate medical attention if irritation persists.
INHALATION: Not a significant route of exposure. Remove to fresh air. If breathing is difficult, GET MEDICAL ATTENTION IMMEDIATELY.
INGESTION: DO NOT induce vomiting. If fully conscious, drink 16 ounces of water. CALL A PHYSCIAN OR POISON CONTROL CENTER IMMEDIATELY. NEVER give an unconscious person anything to ingest.

SECTION 5 – FIRE FIGHTING MEASURES

FLAMMABILTY: Not flammable
FLASH POINT: None (100º C / 212º F): Method: TOC
EXPLOSIVE LIMITS IN AIR: Not available
EXTINGUISHING MEDIA: Not flammable. Use appropriate media for area. Water spray, dry chemical, alcohol foam or carbon dioxide.
FIRE FIGHTING METHODS: Evacuate area of personnel. Wear protective NIOSH-approved self-contained breathing apparatus. Remain upwind of fire to avoid hazardous vapors and decomposition products. Use water spray to cool fire-exposed containers. Run-off of large quantities of product from fire control may cause pollution. Contact appropriate agencies.
HAZARDOUS COMBUSTION PRODUCTS: Carbon Monoxide. Thermal decomposition can lead to irritating gases and vapors.
FIRE AND EXPLOSION HAZARDS: None known.

SECTION 6 – ACCIDENTAL RELEASES MEASURES

Steps to be taken in Case Material is Released or Spilled: Avoid contact with skin and eyes
Small Spill: No special clean-up procedure is necessary for small (less than 1 gallon) spills. Flush spill area with water. Wear rubber gloves.
Large Spill: Use personal protection recommended in Section 8. Isolate area, and deny entry to unnecessary and unprotected personnel. Dam spill, and absorb with earth, sand or similar material. Place in non-leaking containers. Dispose of collected material according to local, state, and federal regulations. Flush residue with large amount of water. Avoid direct discharge to sewers and surface waters.

SECTION 7- HANDLING AND STORAGE

STORAGE: Store in cool, well-ventilated area, away from heat. Keep containers tightly closed. Avoid contact with combustible materials, wood, and organic materials. Store in original container in a secure area away from children and pets.
HANDLING: Avoid contact with eyes, skin or clothing. May be harmful or fatal if swallowed. Use with adequate ventilation. Avoid breathing vapors or mist. Do not eat, drink, or smoke in work area. Wash hand thoroughly after use. Consumer size containers (14, 28, and 42 fluid ounces and gallon containers), should be rinsed and recycled. Empty 5gallon containers and 55gallon drums, may contain product residue in form of vapor, dried product, or liquid, and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE THESE CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY.

DO NOT MIX WITH BLEACH, OR ANY OTHER PRODUCTS AS TOXIC FUMES MAY RESULT. KEEP OUT OF REACH OF CHILDREN.

JELMAR
MATERIAL SAFETY DATA SHEET
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SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION REQUIREMENT: Avoid prolonged breathing mists or dusts of this product. Use with adequate ventilation. Do not use in closed or confined spaces.
RESPIRATORY PROTECTION: None required during normal household use. If product is used in an industrial setting, respiratory protection must be worn if ventilation does not eliminate symptoms or keep levels below recommended exposure limits. If mist or dust is present, wear NIOSH-Approved respirator for dusts and mists, NIOSH-Approved self-contained breathing apparatus, NIOSH-Approved full-face piece positive-pressure, air-supplied respirator. DO NOT exceed limits established by respirator manufacturer. Emergency responders should wear self-contained breathing apparatus (SCBA) to avoid inhalation of product.
EYE PROTECTION: Not required during normal household usage. Industrial users wear safety goggles. Do not wear contact lenses. Emergency responders should wear full eye and face protection.
SKIN PROTECTION: Rubber gloves with protective cuff. Emergency responders should wear impermeable gloves.
OTHER PROTECTION: Emergency responders should wear chemical type (impermeable) protective clothing and footwear where direct contact with chemicals in this product is possible.
WORK/HYGIENIC PRACTICES: Wash thoroughly with soap and water after use or handling.

EXPOSURE GUIDELINES:	**OSHA**		**ACGIH**	
COMPONENT	**PEL**	**STEL/C**	**TWA**	**STEL/C**
1. Water	N.E.	N.E.	N.E.	N.E.
2. Lactic Acid	N.E	N.E.	N.E.	N.E.
3. Gluconic Acid	N.E.	N.E.	N.E.	N.E.
4. Lauryldimethyl Hydroxysultaine	N.E.	N.E.	N.E.	N.E.
5. Propylene Glycol Normal Butyl Ether	N.E.	N.E.	N.E.	N.E.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Boiling point:	100º C / 212º F	**Specific Gravity:**	1.05 – 1.06
Vapor Pressure:	N.D.	**Percent Volatiles:**	~78.6% (Calculated)
Freezing Point:	N.D.	**Evaporation Rate:**	N.D. (nBuAc=1)
Melting Point:	N.D.	**VOC (Wt%):**	<1.5 (Calculated)
Vapor Density (mm Hg):	N.D.	**VOC (LBS/GAL):**	<0.13 (Calculated)
pH:	1.30-1.50	**Solubility in Water:**	100%

SECTION 10 – STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions.
CONDITIONS TO AVOID: Avoid elevated temperatures.
INCOMPATIBLE MATERIALS: Strong oxidizing agents, metals, acids, and bases.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition can lead to release of irritating gases and vapors and carbon oxides.
POSSIBILITY OF HAZARDOUS REACTIONS: No data.

SECTION 11 – TOXICOLOGICAL INFORMATION

LD_{50} ORAL: N.E.
LD_{50} SKIN: N.E.
LC_{50} INHALHATION: N. E.

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SECTION 12- ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: No data available.
CHEMICAL FATE INFORMATION: 28-day biodegradation = 60%. The matter is biodegradable.

SECTION 13 – DISPOSAL CONSIDERATIONS

HAZARDOUS WASTE NUMBER: D002
DISPOSAL METHOD: Dispose of in a permitted hazardous waste management facility following all local, state, and federal regulations.

DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION.
Follow label warnings, since containers may retain some reside of the product.
Processing, use or contamination of this product may change the waste management options. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. State and local disposal regulations may differ from federal disposal regulations.

SECTION 14 - TRANSPORTATION INFORMATION

DOT (Department of Transportation Proper Shipping Name): Not regulated by DOT.
Identification Number: N.A.
Packaging Group: N.A.
UN Number: N.A.
TDG Classification: Not Regulated
IMDG Classification: Not Regulated
IATA Classification: Passenger – Not Regulated
WHIMS (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 CPR.

SECTION 15 – REGULATORY INFORMATION

FEDERAL REGULATIONS:
TSCA INVENTORY STATUS: All components of this product are listed on the TSCA Inventory or are exempt from TSCA Inventory requirements.

SARA TITTLE III SECTION 311/312 CATEGORY:

IMMEDIATE (ACUTE) HEALTH HAZARARD:	YES
DELAYED (CHRONIC) HEALTH HAZARD:	YES
FIRE HAZARD:	NO
SUDDEN RELEASE OF PRESSURE:	NO
REACTIVE HAZARD:	NO

SARA SECTIONS 302/304/313/HAP:

COMPENT	RQ (LBS) (1*)	RQ (LBS) (2*)	TPQ (LBS) (3*)	SEC 313 (4*)	HAP (5*)
1. Water	N.A.	N.A.	N.A.	NO	NO
2. Lactic Acid	N.A.	N.A.	N.A.	NO	NO
3. Gluconic Acid	N.A.	N.A.	N.A.	NO	NO
4. Lauryldimethyl Hydroxysultaine	N.A.	N.A.	N.A.	NO	NO
5. Propylene Glycol Normal Butyl Ether	N.A.	N.A.	N.A.	NO	NO

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REGULATORY AGENCIES

*1: CERCLA Reportable Quantity
*2: SARA Reportable Quantity
*3: SARA EHS Threshold Planning Quantity
*4: SARA 313 Toxic Chemical / Category
*5: U. S. EPA Hazardous Air Pollutant

INTERNATIONAL CHEMICAL INVENTORY STATUS:

EUROPEAN UNION (EINECS)	YES
JAPAN (METI)	YES
AUSTRALIA (ACIS)	YES
KOREA (KECL)	YES
CANADA (DSL)	YES
CANADA (NDSL)	NO
PHILIPPINES	YES

STATES RIGHT TO KNOW: California, New Jersey, Pennsylvania, Minnesota, Massachusetts, and Wisconsin. None.

The following statement is made in order to comply with the California State Drinking Water Act. California Proposition 65: This product does not contain any chemicals known to the State of California to cause cancer and/or to cause birth defects and other reproductive harm.

SECTION 16 – OTHER INFORMATION

NFPA Rating System: Health - 1 / Flammability - 0 / Reactivity - 0 / Special Hazard - None
Precautions to be taken in Handling and Storing: Avoid exposure to excess heat, and prevent from freezing.
Other Precautions: None required.
MSDS ABBREVIATIONS:

N. A.:	Not Applicable
N. D.:	Not Determined
N.E.:	Not Established
C:	Ceiling Limit
HAP:	Hazardous Air Pollutant
VOC:	Volatile Organic Compound

Revision: Format Change ANSI Z400.1-2004 October 2004 R. A. Gaudreault

Although the information and recommendations set forth herein are presented in good faith and believed to be correct as of the date hereof, JELMAR offers no representations as to the completeness or accuracy thereof. Information is provided upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will JELMAR be responsible for damages of any nature whatsoever resulting from use of or reliance upon said information.

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SAFETY DATA SHEET

COMPRESSOR OIL RP 268

000003001349

Version 5.1 Revision Date 2017/01/27 Print Date 2017/01/27

SECTION 1. IDENTIFICATION

Product name	:	COMPRESSOR OIL RP 268
Product code	:	CRP268CBE, CRP268DRP, CRP268DRM, CRP268, CRP268BLK
Manufacturer or supplier's details		Petro-Canada Lubricants Inc. 2310 Lakeshore Road West Mississauga ON L5J 1K2 Canada
Emergency telephone number		Petro-Canada Lubricants Inc.: +1 905-403-5770; CHEMTREC Transport Emergency: 1-800-424-9300; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Compressor Oil RP 268 is used for the lubrication of cylinders and rod packings in natural gas compressors having force-feed lubrication systems. It is recommended for use in compressing sour, wet or contaminated natural gas. It should NEVER be used in equipment compressing pure oxygen or other chemically active gases such as chlorine or hydrogen chloride.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Colour	dark green
Odour	Mild petroleum oil like.

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation

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Skin contact

Aggravated Medical Condition : None known.

Other hazards

None known.

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
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity	72623-85-9	30 - 50 %

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.

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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	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), sulphur oxides (SOx), phosphorus oxides (POx), calcium oxides (CaOx), aldehydes, hydrocarbons, metal oxides, smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	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. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Do not ingest.

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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
lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity	72623-85-9	TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA (Inhalable fraction)	5 mg/m3	ACGIH

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

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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 hands and face before breaks and immediately after handling the product. Wash contaminated clothing before re-use. Ensure that eyewash station and safety shower are proximal to the work-station location.
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	:	dark green
Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	-18 °C (-0.40 °F)
Boiling point/boiling range	:	No data available
Flash point	:	278 °C (532 °F) Method: Cleveland open cup
Fire Point	:	292 °C (558 °F)
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	:	0.8951 kg/l (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble

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Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	269 cSt (40 °C / 104 °F)
		21.9 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, acids, halogens and halogenated compounds.
Hazardous decomposition products	:	May release COx, SOx, SiOx, POx, methacrylate monomers, aldehydes, hydrocarbons, formaldehyde, 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:

lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high viscosity:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 h Test atmosphere: dust/mist

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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

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

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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 product residue in accordance with the instructions of the person responsible for waste disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

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.

National Regulations

TDG

Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

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:

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

SECTION 16. OTHER INFORMATION

For Copy of SDS : Internet: lubricants.petro-canada.com/sds
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

Revision Date : 2017/01/27

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.

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SAFETY DATA SHEET

1. Identification

Product identifier **Copper Anti-Seize & Lubricating Compound**

Other means of identification

Product code 14095

Recommended use Anti-seize and lubricating compound

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufactured or sold by:

Company name CRC Industries, Inc.

Address 885 Louis Dr.
Warminster, PA 18974 US

Telephone

General Information 215-674-4300

Technical Assistance 800-521-3168

Customer Service 800-272-4620

24-Hour Emergency (CHEMTREC) 800-424-9300 (US)
703-527-3887 (International)

Website www.crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
	Gases under pressure	Liquefied gas
Health hazards	Not classified.	
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	

Label elements



Signal word Danger

Hazard statement Extremely flammable aerosol. Contains gas under pressure; may explode if heated.

Precautionary statement

Prevention Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Pressurized container: Do not pierce or burn, even after use. Do not apply while equipment is energized. Extinguish all flames, pilot lights and heaters. Vapors will accumulate readily and may ignite. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. Avoid release to the environment.

Response Wash hands after handling.

Storage Store in a well-ventilated place. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Exposure to high temperature may cause can to burst.

Disposal Dispose of contents/container in accordance with local/regional/national regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
distillates (petroleum), hydrotreated heavy naphthenic		64742-52-5	30 - 40
liquefied petroleum gas		68476-86-8	20 - 30
calcium carbonate		1317-65-3	5 - 10
residual oils (petroleum), hydrotreated		64742-57-0	5 - 10
talc (not containing asbestos fibers)		14807-96-6	5 - 10
aluminium, benzoate fatty acids (C=16-18) hydroxy complexes		82980-54-9	3 - 5
copper		7440-50-8	3 - 5

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation
Move to fresh air. If not breathing, give artificial respiration. Call a physician if symptoms develop or persist.

Skin contact
Wash off immediately with plenty of water. Take off contaminated clothing and wash before reuse. Get medical attention if irritation develops and persists.

Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion
Do not induce vomiting. Call a physician immediately. Never give anything by mouth to a victim who is unconscious or is having convulsions.

Most important symptoms/effects, acute and delayed
Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed
Provide general supportive measures and treat symptomatically.

General information
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media
Water fog. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media
Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical
Contents under pressure. Pressurized container may rupture when exposed to heat or flame. During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters
Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Fire-fighting equipment/instructions
In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.

General fire hazards
Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Emergency personnel need self-contained breathing equipment. Vapors are heavier than air and may spread along floors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. This product is miscible in water. Prevent product from entering drains. Stop the flow of material, if this is without risk. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Use caution around energized equipment. The metal container will conduct electricity if it contacts a live source. This may result in injury to the user from electrical shock and/or flash fire. Avoid contact with eyes, skin, and clothing. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices. For product usage instructions, please see the product label.

Conditions for safe storage, including any incompatibilities

Level 1 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
calcium carbonate (CAS 1317-65-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
copper (CAS 7440-50-8)	PEL	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	PEL	5 mg/m3	Mist.
		2000 mg/m3	
		500 ppm	
residual oils (petroleum), hydrotreated (CAS 64742-57-0)	PEL	5 mg/m3	Mist.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
talc (not containing asbestos fibers) (CAS 14807-96-6)	TWA	0.3 mg/m3	Total dust.
		0.1 mg/m3	Respirable.
		20 mppcf	
		2.4 mppcf	Respirable.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	TWA	5 mg/m3	Inhalable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
residual oils (petroleum), hydrotreated (CAS 64742-57-0)	TWA	5 mg/m3	Inhalable fraction.
talc (not containing asbestos fibers) (CAS 14807-96-6)	TWA	2 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
calcium carbonate (CAS 1317-65-3)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)	Ceiling	1800 mg/m3	
	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
residual oils (petroleum), hydrotreated (CAS 64742-57-0)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
talc (not containing asbestos fibers) (CAS 14807-96-6)	TWA	2 mg/m3	Respirable.

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

Exposure guidelines Occupational Exposure Limits are not relevant to the current physical form of the product.

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.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Polyvinyl chloride (PVC).

Other Wear suitable protective clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using do not smoke. 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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Aerosol.

Color Copper.

Odor Solvent.

Odor threshold Not available.

pH Not available.

Melting point/freezing point Not available.

Initial boiling point and boiling range 680 °F (360 °C) estimated

Flash point	> 429.8 °F (> 221 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	3249.3 hPa estimated
Vapor density	Not available.
Relative density	1.06
Solubility (water)	Negligible.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	500 °F (260 °C) estimated
Decomposition temperature	Not available.
Viscosity (kinematic)	Not available.
Percent volatile	68 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Heat, flames and sparks. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong acids. Strong bases. Strong oxidizing agents.
Hazardous decomposition products	Carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged or excessive inhalation may cause respiratory tract irritation.
Skin contact	Prolonged skin contact may cause temporary irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Health injuries are not known or expected under normal use.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

Product	Species	Test Results
Copper Anti-Seize & Lubricating Compound		
Acute		
Dermal		
LD50	Rabbit	9949 mg/kg calculated
Inhalation		
Mist		
LC50	Rat	72.4 mg/l, 4 hours calculated
Oral		
LD50	Rat	5309 mg/kg calculated

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

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

IARC Monographs. Overall Evaluation of Carcinogenicity

residual oils (petroleum), hydrotreated (CAS 64742-57-0) 3 Not classifiable as to carcinogenicity to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

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

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Based on available data, the classification criteria are not met.

Chronic effects Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components		Species	Test Results
copper (CAS 7440-50-8)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	0.03 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.052 mg/l, 96 hours
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1000 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	5000 mg/l, 96 hours
talc (not containing asbestos fibers) (CAS 14807-96-6)			
Aquatic			
Acute			
Fish	LC50	Zebra danio (Danio rerio)	> 100 g/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil No data available.

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 of waste from residues / unused products This product is not a RCRA hazardous waste (See 40 CFR Part 261.20 – 261.33). Empty containers may be recycled. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate or crush. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose in accordance with all applicable regulations.

Hazardous waste code Not regulated.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Label(s)	2.1
Packing group	Not applicable.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	N82
Packaging exceptions	306
Packaging non bulk	None
Packaging bulk	None

IATA

UN number	UN1950
UN proper shipping name	Aerosols, flammable, Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Packing group	Not applicable.
ERG Code	10L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN1950
UN proper shipping name	AEROSOLS, LIMITED QUANTITY
Transport hazard class(es)	
Class	2
Subsidiary risk	-
Packing group	Not applicable.
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

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

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

Not regulated.

SARA 304 Emergency release notification

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

copper (CAS 7440-50-8)

CERCLA Hazardous Substance List (40 CFR 302.4)

copper (CAS 7440-50-8) Listed.

CERCLA Hazardous Substances: Reportable quantity

copper (CAS 7440-50-8) 5000 LBS

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

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.

Food and Drug Administration (FDA) Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 Hazard categories Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

copper (CAS 7440-50-8)
distillates (petroleum), hydrotreated heavy naphthenic (CAS 64742-52-5)
liquefied petroleum gas (CAS 68476-86-8)
residual oils (petroleum), hydrotreated (CAS 64742-57-0)
talc (not containing asbestos fibers) (CAS 14807-96-6)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

calcium carbonate (CAS 1317-65-3)
copper (CAS 7440-50-8)
residual oils (petroleum), hydrotreated (CAS 64742-57-0)
talc (not containing asbestos fibers) (CAS 14807-96-6)

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

calcium carbonate (CAS 1317-65-3)
talc (not containing asbestos fibers) (CAS 14807-96-6)
copper (CAS 7440-50-8)

US. Rhode Island RTK

copper (CAS 7440-50-8)

US. Pennsylvania Worker and Community Right-to-Know Law

copper (CAS 7440-50-8)
calcium carbonate (CAS 1317-65-3)
residual oils (petroleum), hydrotreated (CAS 64742-57-0)
talc (not containing asbestos fibers) (CAS 14807-96-6)

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.

Volatile organic compounds (VOC) regulations

EPA

VOC content (40 CFR 51.100(s)) 28.1 %

Consumer products (40 CFR 59, Subpt. C) Not regulated

State

Consumer products This product is regulated as an Anti-seize Lubricant (aerosol). This product is compliant for use in all 50 states.

VOC content (CA) 28.1 %

VOC content (OTC) 28.1 %

International Inventories

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

Issue date 04-21-2015

Revision date 07-19-2016

Prepared by Allison Cho

Version # 03

Further information Not available.

HMIS® ratings
Health: 2
Flammability: 3
Physical hazard: 0
Personal protection: B

NFPA ratings
Health: 2
Flammability: 3
Instability: 0

NFPA ratings



Disclaimer The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Industries.

Revision Information This document has undergone significant changes and should be reviewed in its entirety.

OFF!® DEEP WOODS® INSECT REPELLENT - DRY (REG. NO. 30097 P.C.P. ACT)

Version *2.1* Print Date 10/06/2014

Revision Date 09/29/2014 MSDS Number 350000015104

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

Trade name	:	OFF! DEEP WOODS DRY INSECT REPELLENT - AEROSOL
Use of the Substance/Mixture	:	Insect Repellent
Company	:	S.C. Johnson and Son, Limited 1 Webster Street Brantford ON N3T 5R1
Emergency telephone number	:	24 Hour Transport & Medical Emergency Phone (866) 231-5406 24 Hour International Emergency Phone (952) 852-4647 24 Hour Canadian Transport Emergency Phone (CANUTEC) (613) 996-6666

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance / Odor	:	white / aerosol / pleasant
Immediate Concerns	:	Warning FLAMMABLE: CAUSES EYE IRRITATION. Keep away from heat, sparks and flame. Harmful if swallowed. Contents under pressure. Do not puncture or incinerate. Do not store at temperatures above 120 Deg. F (50 Deg C), as container may burst. Avoid contact with eyes and lips.

Potential Health Effects

Exposure routes	:	Eye, Skin, Inhalation, Ingestion.
Eyes	:	Causes: Moderate eye irritation
Skin	:	May cause skin reactions in rare cases.
Inhalation	:	May cause nose, throat, and lung irritation. Inhalation may cause central nervous system effects.
Ingestion	:	Causes headache, drowsiness or other effects to the central nervous system. Harmful if swallowed.

Chemical Name	CAS-No.	Weight percent
N,N-Diethyl-m-toluamide	134-62-3	10.00 - 30.00
Ethyl alcohol	64-17-5	10.00 - 30.00
Butane	106-97-8	10.00 - 30.00
Corn starch	9005-25-8	10.00 - 30.00
Propane	74-98-6	5.00 - 10.00
Isobutane	75-28-5	5.00 - 10.00
Magnesium carbonate	546-93-0	1.00 - 5.00

firefighting		fire. Do not allow run-off from fire fighting to enter drains or water courses. Burns with colourless flame.
Further information	:	Fight fire from maximum distance or protected area. Cool and use caution when approaching or handling fire-exposed containers. For large quantities of flammable liquids, consider containment to prevent the spread of fire. Wear full protective clothing and positive pressure self-contained breathing apparatus. In case of fire and/or explosion do not breathe fumes.
Flash point	:	< -7 °C < 19.4 °F Note: Propellant
Lower explosion limit	:	Note: No data available
Upper explosion limit	:	Note: No data available
NFPA Classification	:	NFPA Level 2 Aerosol

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Remove all sources of ignition. Wear personal protective equipment.
Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Use appropriate containment to avoid environmental contamination. Outside of normal use, avoid release to the environment.
Methods for cleaning up	:	If damage occurs to aerosol can: Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Use only non-sparking equipment. Dike large spills. Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Advice on safe handling	:	Do not puncture or incinerate. Avoid contact with eyes and lips. Avoid breathing vapours, mist or gas. For personal protection see section 8. Do not spray toward face. Do not use in areas without adequate ventilation.

Use only as directed.
KEEP OUT OF REACH OF CHILDREN AND PETS.
Smoking, eating and drinking should be prohibited in the application area.

Advice on protection against fire and explosion : Keep away from heat and sources of ignition.
Take measures to prevent the build up of electrostatic charge.

Storage

Requirements for storage areas and containers : Do not store at temperatures above 120 Deg. F (50 Deg C), as container may burst.
Keep away from food, drink and animal feedingstuffs.
Keep in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Components	CAS-No.	mg/m3	ppm	Non-standard units	Basis
Ethyl alcohol	64-17-5	-	1,000 ppm	-	ACGIH STEL
Butane	106-97-8	-	1,000 ppm	-	ACGIH STEL
Butane	106-97-8	-	1,000 ppm	-	ACGIH STEL
Corn starch	9005-25-8	10 mg/m3	-	-	ACGIH TWA
Propane	74-98-6	-	1,000 ppm	-	ACGIH TWA
Isobutane	75-28-5	-	1,000 ppm	-	ACGIH STEL

Personal protective equipment

Respiratory protection Use only with adequate ventilation.
Do not spray in enclosed areas.

Hand protection : No special requirements.

Eye protection Safety glasses with side-shields

Skin and body protection	:	No special requirements.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling. Smoking, eating and drinking should be prohibited in the application area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	:	aerosol
Color	:	white
Odor	:	pleasant
pH	:	10.3 (as aqueous solution)
Boiling point	:	No data available
Freezing point	:	No data available
Flash point	:	< -7 °C < 19.4 °F Propellant
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Sustains combustion
Auto-ignition temperature	:	No data available
Lower explosion limit	:	No data available
Upper explosion limit	:	No data available
Vapour pressure	:	No data available
Density	:	0.82 g/cm3
Water solubility	:	dispersible
Viscosity, dynamic	:	No data available
Volatile Organic Compounds Total VOC (wt. %)*	:	52.6 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations

10. STABILITY AND REACTIVITY

Conditions to avoid	:	Heat, flames and sparks.
Materials to avoid	:	Strong oxidizing agents Do not mix with bleach or any other household cleaners. Strong bases
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.
Hazardous reactions	:	If accidental mixing occurs and toxic gas is formed, exit area immediately. Do not return until well ventilated.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	LD50 estimated Male: > 5,000 mg/kg Female: >3,735 mg/kg
Acute inhalation toxicity	:	LC50 estimated > 2.79 mg/l
Acute dermal toxicity	:	LD50 estimated > 2,000 mg/kg

Chronic effects

Carcinogenicity	:	None Anticipated
Mutagenicity	:	None Anticipated
Reproductive effects	:	None Anticipated
Teratogenicity	:	None Anticipated
Sensitisation	:	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity effects : No data available

13. DISPOSAL CONSIDERATIONS

PESTICIDAL WASTE:
Observe all applicable Federal, Provincial and State regulations and Local/Municipal ordinances regarding disposal.
Consumer may discard empty container in trash, or recycle where facilities exist.

14. TRANSPORT INFORMATION

Land transport

- **U.S. DOT and Canadian TDG Surface Transportation:**

Proper shipping name	AEROSOLS, Flammable, 2.1
Class:	2.1
UN number	1950
Packaging group:	None.
Note:	Limited quantities derogation may be applicable to this product, please check transport documents.

Sea transport

- *IMDG:*

Proper shipping name	AEROSOLS, Flammable, 2.1
Class:	2
UN number:	1950
Packaging group:	None.
EmS:	F-D, S-U
Note:	Limited quantities derogation may be applicable to this product, please check transport documents.

Air transport

- *ICAO/IATA:*

Proper shipping name	AEROSOLS, Flammable, 2.1
Class:	2.1
UN/ID No.:	UN 1950
Packaging group:	None.
Note:	SC Johnson typically does not ship products via air. Refer to IATA/ICAO Dangerous Goods Regulations for detailed instructions when shipping this item by air.

15. REGULATORY INFORMATION

Notification status	:	All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.
Notification status	:	All ingredients of this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).
California Prop. 65	:	This product is not subject to the reporting requirements under California's Proposition 65.
Canada Regulations	:	This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

HMIS Ratings

Health	2
Flammability	4
Reactivity	0

NFPA Ratings

Health	2
Fire	4
Reactivity	0
Special	-

This information is being provided in accordance with Occupational Safety and Health Administration (OSHA) and Canada's Workplace Hazard Material Information System (WHMIS) regulations. The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information
This document has been prepared using data from sources considered to be technically reliable. It does not constitute a warranty, expressed or implied, as to the accuracy of the information contained herein. Actual conditions of use are beyond the seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Prepared by	SC Johnson Global Safety Assessment &

OFF!® DEEP WOODS® INSECT REPELLENT - DRY (REG. NO. 30097 P.C.P. ACT)

Version *2.1* Print Date 10/06/2014

Revision Date 09/29/2014 MSDS Number 350000015104

	Regulatory Affairs (GSARA)

Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

DIESEL EXHAUST FLUID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http://www.brenntag.ca

WHMIS#: 00070093
Index: HCI9233/14D
Effective Date: 2014 November 10
Date of Revision: 2014 November 10

EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

PRODUCT IDENTIFICATION

Product Name:	Diesel Exhaust Fluid.
Chemical Name:	Not available.
Synonyms:	Diesel Exhaust Fluid, Ultrapure DEF, DEF, AC DELCO DEF.
Chemical Family:	Not available.
Molecular Formula:	Not available.
Product Use:	Not available.

WHMIS Classification / Symbol:

D-2B: Toxic (skin and eye irritant)



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV (TWA)*	*% Concentration*
Urea	57-13-6	---	30 - 60

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:	Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat. See "Other Health Effects" Section.
POTENTIAL HEALTH EFFECTS	
Inhalation:	Prolonged or repeated overexposure to mists may cause mild respiratory irritation. Excessive contact with mist or spray may cause irritation of mucous membranes, coughing and difficulty in breathing. See "Other Health Effects" Section.
Skin Contact:	Skin contact can cause irritation, especially under the finger nails (and other confined spaces such as under rings or watch bands). May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.
Skin Absorption:	Not likely to be absorbed through the skin.
Eye Contact:	Causes eye irritation. Burns can occur if not promptly removed.
Ingestion:	This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.

Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. Solutions are corrosive to most metals. Urea forms corrosive solutions when dissolved in water. High blood concentration of urea increases the risk of glaucoma. May induce osmotic diuresis. Osmotic diuresis is a condition caused by a high concentration of osmotically active substances in the renal tubules (Urea, Sodium Sulphate), which limit the reabsorption of water. (8) May cause central nervous system (CNS) depression. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Anecdotal evidence has shown that the development of first and second degree burns to skin may result from delayed implementation of first aid measures, especially if the liquid material is held in close contact with the skin by contaminated clothing for prolonged periods of time. (6) See Section 11, "Other Studies Relevant to Material".

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	If respiratory problems arise, move the victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Skin Contact:	Flush skin with running water for a minimum of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	***AutoIgnition Temperature (°C)***	**Flammability Limits in Air (%):** ***LEL***	***UEL***
Non-combustible (does not burn).	Not applicable.	Not applicable.	Not applicable.

Flammability Class (WHMIS):	Not regulated.
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include Ammonia, cyanuric acid, biuret, cyanic acid, oxides of carbon, nitrogen and irritating gases.
Unusual Fire or Explosion Hazards:	Closed containers exposed to heat may burst. Spilled material may cause floors and contact surfaces to become slippery. Urea: Hypochlorites may react with primary amines to form nitrogen trichloride which explodes spontaneously in air.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Use media appropriate for surrounding fire and/or materials.
FIRE FIGHTING INSTRUCTIONS	
Instructions to the Fire Fighters:	Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out. Spilled material may cause floors and contact surfaces to become slippery.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dikes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment. Spilled material may cause floors and contact surfaces to become slippery.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing aerosols (vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	General exhaust is acceptable.
Storage Requirements:	Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C.
Special Materials to be Used for Packaging or Containers:	Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	General exhaust is acceptable. Local exhaust ventilation preferred. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection:	Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield or chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from butyl rubber, natural rubber, nitrile rubber or PVC should be impervious under conditions of use. Do not use gloves or protective clothing made from leather. Prior to use, user should confirm impermeability. Discard contaminated gloves.

Respiratory Protection:	No specific guidelines available. Respiratory protection should not be necessary unless a mist is created. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 1 000 ppm organic vapours. Use an air-supplied respirator if concentrations are high or unknown. If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (6)
Other Personal Protective Equipment:	Wear regular work clothing. The use of coveralls is recommended. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

None established for this product.

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Colourless to slightly hazy liquid.
Odour:	Ammonia odour.
Odour Threshold (ppm):	Not available.
Boiling Range (°C):	104 - 106 (3)
Melting/Freezing Point (°C):	Not available.
Vapour Pressure (mm Hg at 20° C):	Not available.
Vapour Density (Air = 1.0):	Not available.
Relative Density (g/cc):	1.08 - 1.14 (3)
Bulk Density: Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	Not available.
Solubility:	Not available.
% Volatile by Volume:	100%
pH:	Not available.
Coefficient of Water/Oil Distribution:	9.8 - 10 (3)
Volatile Organic Compounds (VOC):	Not available.
Flashpoint (°C):	Not available.
	Non-combustible (does not burn).

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Not flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Do not evaporate to dryness.
Materials to Avoid:	Strong oxidizers. Reducing agents. Hypochlorites. Halogens. Acids. Alkalies. Acrylonitrile-Butadiene-Styrene. Polyethylene. Iron and its alloys. Copper and its alloys. Aluminum and its alloys. Zinc and its alloys. Mild steel. Sodium Nitrite. Potassium Nitrite. Chromyl Chloride. Nitrosyl Perchlorate. Gallium Perchlorate. Titanium Tetrachloride. Sodium Hypochlorite, Calcium Hypochlorite or Phosphorus Pentachloride reacts with urea to form nitrogen trichloride which explodes spontaneously in air. (4)
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include Ammonia, cyanuric acid, biuret, cyanic acid, oxides of carbon, nitrogen and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	*LD50 (Oral, Rat)*	*LD50 (Dermal, Rabbit)*	*LC50 (Inhalation, Rat, 4h)*
Urea	8 471 - 14 300 mg/kg (1,3)	---	---

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	No adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated.
Teratogenicity Data:	No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	Application of urea to guinea pig skin increased a subsequent sensitization reaction to epoxy resins. (4)
Other Studies Relevant to Material:	Urea: Application of a saturated urea solution to rabbit eyes caused the loss of corneal epithelium after 5 minutes, with slow regeneration. Application of a 10 % solution to human eyes, several times a day, for one year caused no irritation or discomfort. (4) Male and female rats were administered a 0.45 %, 0.9 % or 4.5 % (approximately 225, 450 or 2,250 mg/Kg/day) urea in the diet with no adverse effects. (4) Bacterial reverse mutation assay- Negative ; Chinese Hamster -Chromosomal aberration test - Positive (very high dose); Mouse -positive (very high dose). (3) No toxic effects on mouse gonads up to 6,750-mg/kg day. No toxic effects on rat gonads up to 2,250-mg/kg day. (3)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Will slowly release ammonia and degrade to nitrate. Ammonia is toxic to fish. However, ammonia release is slow making urea much less toxic than ammonium salts. Non-persistent and non-cumulative when applied using normal agricultural practices. The product itself and its products of degradation are not harmful under normal conditions of careful and responsible use. Urea will promote algae growth and may degrade the quality and taste of water. (3) Urea: 96-hour LC50 (Barillius barna) > 9 100 mg/L. (3) 48-hour EC50 (Daphnia magna) 3 910 mg/L. (3)
Environmental Fate:	Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers. Urea: When released to soil, Urea will hydrolyze into ammonium in a matter of days to several weeks. When released into the soil, Urea may leach into groundwater. When released into water, Urea may biodegrade to a moderate extent. When released into water, Urea is not expected to evaporate significantly. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. Urea is not expected to significantly bioaccumulate. When released into the air, Urea is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, Urea is expected to have a half-life of less than 1 day. (3)

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

This product is not regulated by TDG.

Label(s): Not applicable. Placard: Not applicable.

ERAP Index: -----. Exemptions: None known.

This product is transported warm (25 to 35 Degrees Celsius). Storage and shipping requires insulated tanks and tank cars to prevent crystallization of urea.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

This product is not regulated by DOT.

Label(s): Not applicable. Placard: Not applicable.

CERCLA-RQ: Not available. Exemptions: None known.

This product is transported warm (25 to 35 Degrees Celsius). Storage and shipping requires insulated tanks and tank cars to prevent crystallization of urea.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All components of this product are included on the DSL.

CEPA - NPRI: Not included.

Controlled Products Regulations Classification (WHMIS):

D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: All components of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Not regulated.

NFPA: 2 Health, 0 Fire, 0 Reactivity (3)

HMIS: 2 Health, 0 Fire, 0 Reactivity (3)

INTERNATIONAL

Urea is found on the following inventories: EINECS (European Inventory of Existing Commercial Chemical Substances).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
Phone: (416) 259-8231 Facsimile: (416) 259-5333

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7
Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name : Winter Treat Plus

Product code : 103051, 103052, 103073

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Motor Fuel Additive

1.3. Details of the supplier of the safety data sheet

R.B. Howes & Co., Inc. / Howes Lubricator
60 Ocean State Drive
North Kingstown, RI
T 401-294-5500, 1-800 GET HOWES (438-4693)

1.4. Emergency telephone number

Emergency number : CHEMTREC 1 (800) 424-9300

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable Liquid 3

Skin Irritation 2

Eye Irritation 2A

Carcinogenicity 2

Specific target organ toxicity - Repeated exposure 1

Aspiration Toxicity 1

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



GHS02 GHS07 GHS08

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : Flammable liquid and vapor. Causes skin irritation. Causes serious eye irritation. Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure. May be fatal if swallowed and enters airways.

Precautionary statements (GHS-US) : Keep away from heat/sparks/open flames/hot surfaces.– No smoking. Keep container tightly closed. Ground/Bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Wash hands thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. If exposed or concerned: Get medical advice/attention. If on skin (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. 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. If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3. Other hazards

No additional information available.

2.4. Unknown acute toxicity (GHS-US)

34 percent of the mixture consists of ingredient(s) of unknown acute toxicity.

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable.

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Distillates, petroleum, hydrotreated middle	(CAS No) 64742-46-7	15 - 40	Flam. Liq. 4 Acute Tox. 4 (Inhalation) Asp. Tox. 1
Stoddard solvent	(CAS No) 8052-41-3	15 – 40	Skin Irrit. 2 STOT RE 1 Asp. Tox. 1
Petroleum distillates, hydrotreated light	(CAS No) 64742-47-8	10 – 30	Flam. Liq. 3 Asp. Tox. 1
Solvent naphtha, petroleum, light aromatic	(CAS No) 64742-95-6	7 – 13	Flam. Liq. 3 Skin Irrit. 2 Eye Irrit. 2A Asp. Tox. 1
Benzene, 1,2,4-trimethyl-	(CAS No) 95-63-6	7 – 13	Flam. Liq. 3 Acute Tox. 4 (Inhalation) Skin Irrit. 2 Eye Irrit. 2A STOT SE 3
Solvent naphtha, petroleum, heavy aromatic	(CAS No) 64742-94-5	1 – 5	Flam. Liq. 3 Asp. Tox. 1
Fatty acid amine reaction product	Trade secret	1 – 5	Skin Irrit. 2 Eye Irrit. 2A
Xylenes (o-, m-, p- isomers)	(CAS No) 1330-20-7	1 – 5	Flam. Liq. 3 Acute Tox. 4 (Dermal) Acute Tox. 4 (Inhalation) Skin Irrit. 2 Eye Irrit. 2A
1,3,5-Trimethylbenzene	(CAS No) 108-67-8	1 – 5	Flam. Liq. 3 Skin Irrit. 2 Eye Irrit. 2A STOT SE 3 Asp. Tox. 1
1,2,3-Trimethylbenzene	(CAS No) 526-73-8	1 - 5	Flam. Liq. 3 Skin Irrit. 2 Eye Irrit. 2A STOT SE 3
Nonane	(CAS No) 111-84-2	1 – 5	Flam. Liq. 3 Acute Tox. 4 (Inhalation) Skin Irrit. 2 STOT SE 3 Asp. Tox. 1
Naphthalene	(CAS No) 91-20-3	0.5 - 1.5	Acute Tox. 4 (Oral) Carc. 2
Ethylbenzene	(CAS No) 100-41-4	0.1 - 1	Flam. Liq. 2 Acute Tox. 4 (Inhalation) Skin Irrit. 2 Eye Irrit. 2B Carc. 2 Asp. Tox. 1
Cumene	(CAS No) 98-82-8	< 0.1	Flam. Liq. 3 Carc. 2 STOT SE 3 Asp. Tox. 1

* The specific chemical identity and exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical advice/attention if you feel unwell.

First-aid measures after skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician if irritation develops and persists.

First-aid measures after eye contact : In case of contact, immediately flush eyes with plenty of water. Remove contact lenses, if worn. If irritation persists, get medical attention.

First-aid measures after ingestion : If swallowed, do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get immediate medical advice/attention.

NEXREG

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Symptoms/injuries after skin contact : Causes skin irritation. Symptoms may include redness, edema, drying, defatting and cracking of the skin.

Symptoms/injuries after eye contact : Causes serious eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

Symptoms/injuries after ingestion : May be fatal if swallowed and enters airways. This product may be aspirated into the lungs and cause chemical pneumonitis. May cause stomach distress, nausea or vomiting.

4.3. Indication of any immediate medical attention and special treatment needed

Symptoms may not appear immediately. In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Powder, water fog, foam, carbon dioxide.

Unsuitable extinguishing media : Do not use water jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Products of combustion may include, and are not limited to: oxides of carbon.

5.3. Advice for firefighters

Protection during firefighting : Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). Use water spray to keep fire-exposed containers cool.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Eliminate sources of ignition.

6.2. Methods and material for containment and cleaning up

For containment : Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in a suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment (PPE).

Methods for cleaning up : Scoop up material and place in a disposal container. Spilled material may present a slipping hazard. Provide ventilation.

6.3. Reference to other sections

See section 8 for further information on protective clothing and equipment and section 13 for advice on waste disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from sources of ignition - No smoking. Avoid contact with skin and eyes. Do not breathe dust/fume/gas/mist/vapors/ spray. Do not swallow. Handle and open container with care. When using do not eat, drink or smoke. Use only outdoors or in a well-ventilated area.

Hygiene measures : Launder contaminated clothing before reuse. Wash hands before eating, drinking, or smoking.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed.

Storage conditions : Keep locked up and out of reach of children. Keep container tightly closed and in a well-ventilated place. Keep cool.

7.3. Specific end use(s)

Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Distillates, petroleum, hydrotreated middle (64742-46-7)	
ACGIH	Not applicable
OSHA	Not applicable

Stoddard solvent (8052-41-3)		
ACGIH	ACGIH TWA (ppm)	100 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	2900 mg/m³

NEXREG

Stoddard solvent (8052-41-3)		
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

Petroleum distillates, hydrotreated light (64742-47-8)	
ACGIH	Not applicable
OSHA	Not applicable

Solvent naphtha, petroleum, light aromatic (64742-95-6)	
ACGIH	Not applicable
OSHA	Not applicable

Benzene, 1,2,4-trimethyl- (95-63-6)	
ACGIH	Not applicable
OSHA	Not applicable

Solvent naphtha, petroleum, heavy aromatic (64742-94-5)	
ACGIH	Not applicable
OSHA	Not applicable

Fatty acid amine reaction product	
ACGIH	Not applicable
OSHA	Not applicable

Xylenes (o-, m-, p- isomers) (1330-20-7)		
ACGIH	ACGIH TWA (ppm)	100 ppm
ACGIH	ACGIH STEL (ppm)	150 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	435 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	100 ppm

1,3,5-Trimethylbenzene (108-67-8)		
ACGIH	ACGIH TWA (ppm)	25 ppm
OSHA	Not applicable	

1,2,3-Trimethylbenzene (526-73-8)	
ACGIH	Not applicable
OSHA	Not applicable

Nonane (111-84-2)		
ACGIH	ACGIH TWA (ppm)	200 ppm
OSHA	Not applicable	

Naphthalene (91-20-3)		
ACGIH	ACGIH TWA (ppm)	10 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	50 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	10 ppm

Ethylbenzene (100-41-4)		
ACGIH	ACGIH TWA (ppm)	20 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	435 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	100 ppm

Cumene (98-82-8)		
ACGIH	ACGIH TWA (ppm)	50 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	245 mg/m³

NEXREG

Cumene (98-82-8)		
OSHA	OSHA PEL (TWA) (ppm)	50 ppm

8.2. Exposure controls

Appropriate engineering controls : Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapor, etc.) below recommended exposure limits.

Hand protection : Wear chemically resistant protective gloves.

Eye protection : Wear eye protection.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment. 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.

Environmental exposure controls : Maintain levels below Community environmental protection thresholds.

Other information : Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking. Handle according to established industrial hygiene and safety practices.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Appearance : No data available

Colour : Light amber

Odour : Distinctive

Odour threshold : No data available

pH : No data available

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : 54.4 °C (130 °F)

Relative evaporation rate (butylacetate=1) : No data available

Flammability (solid, gas) : Flammable

Explosive limits : No data available

Explosive properties : No data available

Oxidising properties : No data available

Vapour pressure : < 0.1 mm Hg

Relative density : < 0.9 (H2O = 1)

Relative vapour density at 20 °C : > 1 (air = 1)

Solubility : Insoluble.

Partition coefficient: n-octanol/water : No data available

Log Kow : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity : No data available

Viscosity, kinematic : < 20.5 cSt @ 40 °C (104 °F)

Viscosity, dynamic : No data available

9.2. Other information

VOC content : 715 g/l

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reaction known under conditions of normal use.

10.2. Chemical stability

Stable under normal storage conditions.

10.3. Possibility of hazardous reactions

No dangerous reaction known under conditions of normal use.

10.4. Conditions to avoid

Heat. Incompatible materials. Sources of ignition.

10.5. Incompatible materials

Strong oxidizers.

10.6. Hazardous decomposition products

May include, and are not limited to: oxides of carbon.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified.

Winter Treat Plus	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rat	> 2000 mg/kg
LC50 inhalation rat	Not available.

Distillates, petroleum, hydrotreated middle (64742-46-7)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	4.6 mg/l/4h

Petroleum distillates, hydrotreated light (64742-47-8)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	> 5.2 mg/l/4h

Solvent naphtha, petroleum, light aromatic (64742-95-6)	
LD50 oral rat	8400 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	3400 ppm/4h

Benzene, 1,2,4-trimethyl- (95-63-6)	
LD50 oral rat	3280 mg/kg
LD50 dermal rabbit	> 3160 mg/kg
LC50 inhalation rat	18 g/m³/4h

Solvent naphtha, petroleum, heavy aromatic (64742-94-5)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 2 ml/kg
LC50 inhalation rat	> 5.28 mg/l/4h

Fatty acid amine reaction product	
LD50 oral rat	> 3000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg

Xylenes (o-, m-, p- isomers) (1330-20-7)	
LD50 oral rat	4300 mg/kg
LD50 dermal rabbit	1700 mg/kg
LC50 inhalation rat	5000 ppm/4h

1,3,5-Trimethylbenzene (108-67-8)	
LC50 inhalation rat	24 g/m³/4h

Nonane (111-84-2)	
LC50 inhalation rat	3200 ppm/4h

Naphthalene (91-20-3)	
LD50 oral rat	490 mg/kg
LD50 dermal rabbit	>20 g/kg

Ethylbenzene (100-41-4)	
LD50 oral rat	3500 mg/kg
LD50 dermal rabbit	15400 mg/kg

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Ethylbenzene (100-41-4)	
LC50 inhalation rat	17.2 mg/l/4h
Cumene (98-82-8)	
LD50 dermal rabbit	12300 µL/kg
LC50 inhalation rat	>3577 ppm/6h

Skin corrosion/irritation : Causes skin irritation.
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitisation : Based on available data, the classification criteria are not met.
Germ cell mutagenicity : Based on available data, the classification criteria are not met.
Carcinogenicity : Suspected of causing cancer.

Xylenes (o-, m-, p- isomers) (1330-20-7)	
IARC group	3 - Not classifiable
Naphthalene (91-20-3)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity, 3 - Reasonably anticipated to be Human Carcinogen
Ethylbenzene (100-41-4)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity
Cumene (98-82-8)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity, 3 - Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : Based on available data, the classification criteria are not met.
Specific target organ toxicity (single exposure) : Based on available data, the classification criteria are not met.
Specific target organ toxicity (repeated exposure) : Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard : May be fatal if swallowed and enters airways.

Symptoms/injuries after inhalation : May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Symptoms/injuries after skin contact : Causes skin irritation. Symptoms may include redness, edema, drying, defatting and cracking of the skin.
Symptoms/injuries after eye contact : Causes serious eye irritation;Symptoms may include discomfort or pain, excess blinking and tear production, with marked redness and swelling of the conjunctiva.
Symptoms/injuries after ingestion : May be fatal if swallowed and enters airways. This product may be aspirated into the lungs and cause chemical pneumonitis. May cause stomach distress, nausea or vomiting.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : May cause long-term adverse effects in the aquatic environment.

12.2. Persistence and degradability

Winter Treat Plus	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Winter Treat Plus	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Additional information : Handle empty containers with care because residual vapours are flammable.

NEXREG

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

UN-No.(DOT) : UN1268

Proper Shipping Name (DOT) : Petroleum distillates, n.o.s.

Transport hazard class(es) (DOT) : 3

Hazard labels (DOT) :



Packing group (DOT) : III

Additional information

Other information : No supplementary information available.

Special transport precautions : Do not handle until all safety precautions have been read and understood.

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory.

Benzene, 1,2,4-trimethyl- (95-63-6)	
Listed on United States SARA Section 313	
SARA Section 313 - Emission Reporting	1.0 %

Nonane (111-84-2)	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.

Xylenes (o-, m-, p- isomers) (1330-20-7)	
Listed on United States SARA Section 313	
SARA Section 313 - Emission Reporting	1.0 %

Naphthalene (91-20-3)	
Listed on United States SARA Section 313	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.
SARA Section 313 - Emission Reporting	0.1 %

Ethylbenzene (100-41-4)	
Listed on United States SARA Section 313	
SARA Section 313 - Emission Reporting	0.1 %

15.2. US State regulations

Winter Treat Plus	
State or local regulations	This product contains chemicals known to the State of California to cause cancer.

SECTION 16: Other information

Date of issue : 06/01/2015

Other information : None.

Disclaimer: We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind. The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for the user's own particular use.

Revision Number: 009.3

Issue date: 04/26/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **LOCTITE 271 HS TL known as LOC 6ML 271RED TLOCKER H 12PG**
Product type: Anaerobic Sealant
Restriction of Use: None identified
Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

IDH number: 209741
Item number: 27100
Region: United States
Contact information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW	
WARNING:	CAUSES SKIN IRRITATION. MAY CAUSE AN ALLERGIC SKIN REACTION. CAUSES SERIOUS EYE IRRITATION.

HAZARD CLASS	HAZARD CATEGORY
SKIN IRRITATION	2
EYE IRRITATION	2A
SKIN SENSITIZATION	1

PICTOGRAM(S)



Precautionary Statements

Prevention: Avoid breathing vapors, mist, or spray. Wash affected area thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves, eye protection, and face protection.

Response: IF ON SKIN: Wash with plenty of water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation or rash occurs: Get medical attention. If eye irritation persists: Get medical attention. Take off contaminated clothing.

Storage: Not prescribed

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Polyglycol dimethacrylate	25852-47-5	60 - 70
Saccharin	81-07-2	1 - 5
Cumene hydroperoxide	80-15-9	1 - 5
Cumene	98-82-8	0.1 - 1

* Exact percentages may vary or are trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Skin contact: Immediately flush skin with plenty of water (using soap, if available). Remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Ingestion: DO NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Symptoms: See Section 11.

5. FIRE FIGHTING MEASURES

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. In case of fire, keep containers cool with water spray.

Unusual fire or explosion hazards: Uncontrolled polymerization may occur at high temperatures resulting in explosions or rupture of storage containers.

Hazardous combustion products: Oxides of carbon. Oxides of sulfur. Oxides of nitrogen. Irritating organic vapours.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways.

Clean-up methods: Remove all sources of ignition. Evacuate and ventilate spill area; dike spill to prevent entry into water system; wear full protective equipment during clean-up. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Scrape up as much material as possible. Store in a partly filled, closed container until disposal. Refer to Section 8 "Exposure Controls / Personal Protection" prior to clean up.

7. HANDLING AND STORAGE

Handling: Use only with adequate ventilation. Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Keep container closed. Refer to Section 8.

Storage: For safe storage, store at or below 38 °C (100.4 °F)
Keep in a cool, well ventilated area away from heat, sparks and open flame. Keep container tightly closed until ready for use.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Polyglycol dimethacrylate	None	None	None	None
Saccharin	None	None	None	None
Cumene hydroperoxide	None	None	1 ppm (6 mg/m3) TWA (SKIN)	None
Cumene	50 ppm TWA	50 ppm (245 mg/m3) PEL (SKIN)	None	None

Engineering controls: Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Respiratory protection: Use NIOSH approved respirator if there is potential to exceed exposure limit(s).

Eye/face protection: Safety goggles or safety glasses with side shields. Full face protection should be used if the potential for splashing or spraying of product exists. Safety showers and eye wash stations should be available.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact. Butyl rubber gloves. Natural rubber gloves. Neoprene gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Color: Red
Odor: Mild
Odor threshold: Not available.
pH: Not applicable
Vapor pressure: < 5 mm hg (26.7 °C (80.1 °F))
Boiling point/range: > 148.9 °C (> 300°F)
Melting point/ range: Not available.
Specific gravity: 1.1
Vapor density: Not available.
Flash point: > 93.3 °C (> 199.94 °F) Tagliabue closed cup
Flammable/Explosive limits - lower: Not available.
Flammable/Explosive limits - upper: Not available.
Autoignition temperature: Not available.
Flammability: Not applicable
Evaporation rate: Not available.
Solubility in water: Slight
Partition coefficient (n-octanol/water): Not available.
VOC content: 0.82 %; 7.81 g/l
Viscosity: Not available.
Decomposition temperature: Not available.

10. STABILITY AND REACTIVITY

Stability: Stable under normal conditions of storage and use.

Hazardous reactions: None under normal processing. Polymerization may occur at elevated temperature or in the presence of incompatible materials.

Hazardous decomposition products: Phenolics. Oxides of sulfur. Oxides of carbon. Oxides of nitrogen. Irritating organic vapours.

Incompatible materials: Strong oxidizing agents. Strong acids. Copper. Iron. Strong reducing agents. Rust.

Reactivity: Not available.

Conditions to avoid: Elevated temperatures. Heat, flames, sparks and other sources of ignition. Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation: Inhalation of vapors or mists of the product may be irritating to the respiratory system.
Skin contact: Causes skin irritation. May cause allergic skin reaction.
Eye contact: Causes serious eye irritation.
Ingestion: May cause gastrointestinal tract irritation if swallowed.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Polyglycol dimethacrylate	None	Allergen, Irritant
Saccharin	Oral LD50 (Mouse) = 17 g/kg	No Target Organs
Cumene hydroperoxide	Inhalation LC50 (Mouse, 4 h) = 200 mg/l	Allergen, Central nervous system, Corrosive, Irritant, Mutagen
Cumene	Oral LD50 (Rat) = 2.91 g/kg Oral LD50 (Rat) = 1,400 mg/kg Inhalation LC50 (Rat, 4 h) = 8000 ppm	Central nervous system, Irritant, Lung

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Polyglycol dimethacrylate	No	No	No
Saccharin	No	No	No
Cumene hydroperoxide	No	No	No
Cumene	Reasonably Anticipated to be a Human Carcinogen.	Group 2B	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: Not a RCRA hazardous waste.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: RQ, Environmentally hazardous substance, liquid, n.o.s.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III
DOT Hazardous Substance(s): alpha,alpha-Dimethylbenzylhydroperoxide

International Air Transportation (ICAO/IATA)

Proper shipping name: RQ, Environmentally hazardous substance, liquid, n.o.s.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

Water Transportation (IMO/IMDG)

Proper shipping name: RQ, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification: None above reporting de minimis

CERCLA/SARA Section 302 EHS: None above reporting de minimis.
None above reporting de minimis.
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Saccharin (CAS# 81-07-2). Cumene hydroperoxide (CAS# 80-15-9).
CERCLA Reportable quantity: Cumene hydroperoxide (CAS# 80-15-9) 10 lbs. (4.54 kg)

California Proposition 65: This product contains a chemical known in the State of California to cause cancer.

Canada Regulatory Information

CEPA DSL/NDSL Status: Contains one or more components listed on the Non-Domestic Substances List. All other components are listed on or are exempt from listing on the Domestic Substances List. Components listed on the NDSL must be tracked by all Canadian Importers of Record as required by Environment Canada. They may be imported into Canada in limited quantities. Please contact Regulatory Affairs for additional details.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: Reviewed SDS. Reissued with new date. 3

Prepared by: Sheila Gines, Regulatory Affairs Specialist

Issue date: 04/26/2017

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MATERIAL SAFETY DATA SHEET

03702
07 00

DATE OF PREPARATION
May 4, 2015

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER
03702

PRODUCT NAME
KRYLON® Industrial QUIK-MARK™ Solvent-Based Inverted Marking Paint (Fluorescent), Orange

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
KRYLON INDUSTRIAL PRODUCTS GROUP
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 247-3266 www.kpg-industrial.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
14	74-98-6	**Propane**		
		ACGIH TLV	1000 PPM	760 mm
		OSHA PEL	1000 PPM	
6	106-97-8	**Butane**		
		ACGIH TLV	1000 PPM	760 mm
		OSHA PEL	800 PPM	
8	110-54-3	**Hexane**		
		ACGIH TLV	50 PPM	127 mm
		OSHA PEL	50 PPM	
4	107-83-5	**2-Methylpentane**		
		ACGIH TLV	Not Available	211 mm
		OSHA PEL	Not Available	
1	96-14-0	**3-Methylpentane**		
		ACGIH TLV	500 PPM	211 mm
		OSHA PEL	Not Available	
1	79-29-8	**2,3-Dimethylbutane**		
		ACGIH TLV	Not Available	230 mm
		OSHA PEL	Not Available	
9	142-82-5	**Heptane**		
		ACGIH TLV	400 PPM	50 mm
		ACGIH TLV	500 PPM STEL	
		OSHA PEL	400 PPM	
		OSHA PEL	500 PPM STEL	
8	64742-89-8	**Lt. Aliphatic Hydrocarbon Solvent**		
		ACGIH TLV	300 PPM	12 mm
		OSHA PEL	300 PPM	
0.4	100-41-4	**Ethylbenzene**		
		ACGIH TLV	20 PPM	7.1 mm
		OSHA PEL	100 PPM	
		OSHA PEL	125 PPM STEL	
2	1330-20-7	**Xylene**		
		ACGIH TLV	100 PPM	5.9 mm
		ACGIH TLV	150 PPM STEL	
		OSHA PEL	100 PPM	
		OSHA PEL	150 PPM STEL	
0.3	14808-60-7	**Quartz**		
		ACGIH TLV	0.025 mg/m3 as Resp. Dust	
		OSHA PEL	0.1 mg/m3 as Resp. Dust	
27	1317-65-3	**Calcium Carbonate**		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.
Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL
Propellant < 0 °F	0.9	9.5

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY
Not Available
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.
This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
None required for normal application of aerosol products where minimal skin contact is expected. For long or repeated contact, wear chemical resistant gloves.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.
OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	7.37 lb/gal	883 g/l
SPECIFIC GRAVITY	0.89	
BOILING POINT	<0 - 325 °F	<-18 - 162 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	78%	
EVAPORATION RATE	Faster than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	
pH	> 2.0, < 11.5	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)

Volatile Weight 56.25% Less Water and Federally Exempt Solvents

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

Prolonged and repeated exposure to Hexane may cause damage to nerve tissue of the arms and legs (peripheral neuropathy), resulting in muscular weakness and loss of sensation. This effect may be increased by the presence of Methyl Ethyl Ketone.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Ethylbenzene is classified by IARC as possibly carcinogenic to humans (2B) based on inadequate evidence in humans and sufficient evidence in laboratory animals. Lifetime inhalation exposure of rats and mice to high ethylbenzene concentrations resulted in increases in certain types of cancer, including kidney tumors in rats and lung and liver tumors in mice. These effects were not observed in animals exposed to lower concentrations. There is no evidence that ethylbenzene causes cancer in humans.

Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
74-98-6	Propane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
106-97-8	Butane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
110-54-3	Hexane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		28700 mg/kg
107-83-5	2-Methylpentane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
96-14-0	3-Methylpentane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
79-29-8	2,3-Dimethylbutane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
142-82-5	Heptane			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
64742-89-8	Lt. Aliphatic Hydrocarbon Solvent			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
100-41-4	Ethylbenzene			
		LC50 RAT	4HR	Not Available
		LD50 RAT		3500 mg/kg
1330-20-7	Xylene			
		LC50 RAT	4HR	5000 ppm
		LD50 RAT		4300 mg/kg
14808-60-7	Quartz			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
1317-65-3	Calcium Carbonate			
		LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.
Do not incinerate. Depressurize container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

May be classed as LTD. QTY. OR ORM-D
UN1950, AEROSOLS, 2.1, LIMITED QUANTITY, (ERG#126)

Canada (TDG)

May be classed as LTD. QTY. OR ORM-D
UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, (ERG#126)

IMO

May be shipped as Limited Quantity
UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, EmS F-D, S-U

IATA/ICAO

UN1950, AEROSOLS, FLAMMABLE, 2.1, LIMITED QUANTITY

SECTION 15 — REGULATORY INFORMATION

SARA 313 *(40 CFR 372.65C)* SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
110-54-3	Hexane	8	
100-41-4	Ethylbenzene	0.3	
1330-20-7	Xylene	2	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

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

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Oxygen

Safety Data Sheet E-4638

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979 Revision date: 08-03-2016 Supersedes: 10-15-2013

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Name	:	Oxygen
CAS No	:	7782-44-7
Formula	:	O2
Other means of identification	:	Oxygen, Compressed; Medipure® Oxygen; Aviator's Breathing Oxygen; USP Oxygen; Oxygen - Diving Grade; Dioxygen
Product group	:	Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions	:	Medical applications Industrial use Diving Gas (Underwater Breathing)

1.3. Supplier

Praxair Canada inc.
1200 – 1 City Centre Drive
Mississauga - Canada L5B 1M2
T 1-905-803-1600 - F 1-905-803-1682
www.praxair.ca

1.4. Emergency telephone number

Emergency number	:	1-800-363-0042 Call emergency number 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.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Ox. Gas 1	H270
Compressed gas	H280

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



GHS03 GHS04

Signal word : DANGER

Hazard statements : MAY CAUSE OR INTENSIFY FIRE; OXIDIZER
CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED

Precautionary statements : Do not handle until all safety precautions have been read and understood
Keep away from clothing and other combustible materials
Keep valves and fittings free from oil and grease
In case of fire: Stop leak if safe to do so
Use and store only outdoors or in a well-ventilated area
Protect from sunlight when ambient temperature exceeds 52°C (125°F)
Use a back flow preventive device in the piping
Use only with equipment of compatible materials of construction and rated for cylinder pressure

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DO NOT change or force fit connections
Avoid spills. Do not walk on or roll equipment over spills
Use only with equipment cleaned for oxygen service
Open valve slowly
Close valve after each use and when empty

2.3. Other hazards

Other hazards not contributing to the classification : Breathing 80 percent or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain, and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and central nervous system (CNS) effects, resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness, and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Oxygen (Main constituent)	(CAS No) 7782-44-7	> 99.5	

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Get medical advice/attention. Remove to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : In case of eye irritation: Rinse immediately with plenty of water. Consult an ophthalmologist if irritation persists.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : None.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Vigorously accelerates combustion. Use media appropriate for surrounding fire. Water (e.g, safety shower) is the preferred extinguishing media for clothing fires.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

Fire hazard : Oxidizing agent; vigorously accelerates combustion. Contact with flammable materials may cause fire or explosion.

Explosion hazard : CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED.

Reactivity : No additional information available.

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

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5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : High-pressure, oxidizing gas

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.

Protection during firefighting : Self-contained breathing apparatus.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems

Stop flow of product if safe to do so

Use water spray or fog to knock down fire fumes if possible.

Other information : Heat of fire can build pressure in container and cause it to rupture. Cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by TC.) No part of the container should be subjected to a temperature higher than 125°F (52°C). Smoking, flames, and electric sparks in the presence of enriched oxygen atmospheres are potential explosion hazards.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Ensure adequate air ventilation. Eliminate ignition sources. Evacuate area. Try to stop release. Monitor concentration of released product. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Stop leak if safe to do so.

6.2. Methods and materials for containment and cleaning up

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

Safe use of the product : **The suitability of this product as a component in underwater breathing gas mixtures** is to be determined by or under the supervision of personnel experienced in the use of underwater breathing gas mixtures and familiar with the physiological effects, methods employed, frequency and duration of use, hazards, side effects, and precautions to be taken.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post “No Smoking" or "Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls : Avoid oxygen rich (>23,5%) atmospheres. Use a local exhaust system with sufficient flow velocity to maintain an adequate supply of air in the worker's breathing zone. Mechanical (general): General exhaust ventilation may be acceptable if it can maintain an adequate supply of air.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection : Wear goggles when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Respiratory 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 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. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Environmental exposure controls : **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 information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Colourless gas.

Molecular mass : 32 g/mol

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Colour	:	Colourless.
Odour	:	No odour warning properties.
Odour threshold	:	No data available
pH	:	Not applicable.
pH solution	:	No data available
Relative evaporation rate (butylacetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	>= -219 °C (-362°F)
Freezing point	:	No data available
Boiling point	:	-183 °C (-297°F)
Flash point	:	Not applicable.
Critical temperature	:	-118.6 °C (-181.48°F)
Auto-ignition temperature	:	Not applicable.
Decomposition temperature	:	No data available
Vapour pressure	:	Not applicable.
Vapour pressure at 50 °C	:	No data available
Critical pressure	:	50.4 bar (731.4 psia)
Relative vapour density at 20 °C	:	0.0827 lb/ft3 (1.325 kg/m3) absolute vapour density at 70°F/21.1°C, 1 atm
Relative density	:	1.1
Relative density of saturated gas/air mixture	:	No data available
Density	:	1.4289 kg/m³ (at 21.1 °C)
Relative gas density	:	1.1
Solubility	:	Water: 39 mg/l
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	:	No data available
Explosive properties	:	Not applicable.
Oxidizing properties	:	Oxidizer.
Flammability (solid, gas)	:	Non flammable Non flammable

9.2. Other information

Gas group	:	Compressed gas
Additional information	:	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	:	No additional information available.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Violently oxidizes organic material.
Conditions to avoid	:	None under recommended storage and handling conditions (see section 7).
Incompatible materials	:	Keep equipment free from oil and grease. Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (> 30 bar) oxygen lines in case of combustion. May react violently with combustible materials. May react violently with reducing agents.
Hazardous decomposition products	:	None.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified
Acute toxicity (inhalation)	:	Not classified
Skin corrosion/irritation	:	Not classified pH: Not applicable.
Serious eye damage/irritation	:	Not classified pH: Not applicable.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Oxygen (7782-44-7)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Oxygen (7782-44-7)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Oxygen (7782-44-7)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on the ozone layer : None

Effect on global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

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14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG)	:	UN1072
TDG Primary Hazard Classes	:	2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.
TDG Subsidiary Classes	:	5.1
Proper shipping name	:	OXYGEN, COMPRESSED
ERAP Index	:	3 000
Explosive Limit and Limited Quantity Index	:	0.125 L (0,125 L)
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	75 L

14.3. Air and sea transport

IMDG

UN-No. (IMDG)	:	1072
Proper Shipping Name (IMDG)	:	OXYGEN, COMPRESSED
Class (IMDG)	:	2 - Gases
MFAG-No	:	122

IATA

UN-No. (IATA)	:	1072
Proper Shipping Name (IATA)	:	Oxygen, compressed
Class (IATA)	:	2

SECTION 15: Regulatory information

15.1. National regulations

Oxygen (7782-44-7)

Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Oxygen (7782-44-7)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican national Inventory of Chemical Substances)

SECTION 16: Other information

Date of issue	:	15/10/1979
Revision date	:	03/08/2016
Supersedes	:	15/10/2013

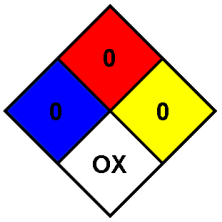
Indication of changes:

Training advice	:	Ensure operators understand the hazard of oxygen enrichment.

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Other information	:	Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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 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 Safety Data Sheet. Since the use of this information and the conditions of use 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, SDSs are furnished on sale or delivery by Praxair Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.ca. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write Praxair Canada Inc, (Phone: 1-888-257-5149; Address: Praxair Canada Inc, 1 City Centre Drive, Suite 1200, Mississauga, Ontario, L5B 1M2). PRAXAIR and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.

NFPA health hazard	:	0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.
NFPA fire hazard	:	0 - Materials that will not burn.
NFPA reactivity	:	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
NFPA specific hazard	:	OX - This denotes an oxidizer, a chemical which can greatly increase the rate of combustion/fire.



HMIS III Rating

Health	:	0 Minimal Hazard - No significant risk to health
Flammability	:	0 Minimal Hazard - Materials that will not burn
Physical	:	3 Serious Hazard - Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion

SDS Canada (GHS) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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Power Steering Fluid

SECTION 1. IDENTIFICATION

Product Identifier	Power Steering Fluid
Other Means of Identification	15-881, 15-883, 15-888, 25-889, 35-870PRES, 35-871PRES, 35-874PRES, 35-881C, 35-881CQ, 35-881SO, 35-883AS, 35-883CQ, 35-883PC, 35-883SO, 15-881OEM
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	01290029

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Skin corrosion/irritation - Category 2; Serious eye damage/eye irritation - Category 2B

GHS Label Elements



Signal Word:
Warning

Hazard Statement(s):

H315 Causes skin irritation.
H320 Causes eye irritation.

Precautionary Statement(s):

Prevention:

P264 Wash hands and skin thoroughly after handling.
P280 Wear protective gloves.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of water.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.

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.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Highly Refined Mineral Oils (Petroleum)		60-100	

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

Inhalation

Remove source of exposure or move to fresh air. Get medical advice/attention 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). Quickly and gently blot or brush away excess chemical. Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Get medical advice/attention if you feel unwell or are concerned. If skin irritation occurs get medical advice/attention. Clean clothing, shoes and leather goods. Injection of pressurized hydrocarbons can cause severe, permanent tissue damage. Initial symptoms may be minor. Injection of petroleum hydrocarbons requires immediate medical attention.

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

Rinse mouth with water. Get medical advice/attention if you feel unwell or are concerned.

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.

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

Not combustible. Use extinguishing agent suitable for surrounding fire.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Chemical

Can ignite if strongly heated.
In a fire, the following hazardous materials may be generated: 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

Use the personal protective equipment recommended in Section 8 of this safety data sheet.

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

Not available.

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. Provide eyewash in work area, if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles.

Skin Protection

Not required, if used as directed.

Respiratory Protection

Not normally required if product is used as directed.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Light amber.
Odour	Hydrocarbon
Odour Threshold	Not available
pH	Not applicable
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	188 ºC (370 ºF) (closed cup)
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	< 0.08 mm Hg (0.01 kPa) at 20 ºC
Vapour Density (air = 1)	> 1
Relative Density (water = 1)	0.88
Solubility	Practically insoluble in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	46 centistokes at 25 ºC (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

Prolonged exposure to high temperatures. Open flames, sparks, static discharge, heat and other ignition sources. Temperatures above 188.0 ºC (370.4 ºF)

Incompatible Materials

Strong oxidizing agents (e.g. perchloric acid).

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide; corrosive sulfur oxides; corrosive phosphorous oxides; corrosive, oxidizing nitrogen oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; eye contact.

Acute Toxicity

LC50: Not applicable.

LD50 (oral): Not applicable.

LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

Human experience and animal tests show moderate or severe irritation.

Serious Eye Damage/Irritation

Human experience and animal tests show serious eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May be harmful based on limited evidence. As a mist nose and throat irritation.

Skin Absorption

No information was located.

Ingestion

May be harmful based on limited evidence. If large amounts are swallowed depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A laxative effect if large amounts are swallowed. Symptoms may include nausea, vomiting, stomach cramps and diarrhea.

Aspiration Hazard

No information was located.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause If inhaled: irritation of the respiratory system. Respiratory tract injury has been observed.
May cause Following skin contact: dermatitis. Symptoms may include dry, red, cracked skin (dermatitis).

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Not known to cause cancer.

Reproductive Toxicity

Development of Offspring

No information was located.

Sexual Function and Fertility

No information was located.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

No information was located.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

No information was located.

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

Not regulated under Canadian TDG Regulations. Not regulated under US DOT Regulations.

Environmental Hazards	Not applicable
Special Precautions for User	Not applicable

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

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.

SECTION 16. OTHER INFORMATION

SDS Prepared By	Compliance and Regulatory Department
Phone No.	905-878-5544
Date of Preparation	October 29, 2015
Additional Information	We are committed to uphold the Industry Consumer Ingredient Communication Voluntary

Initiative.
Please send us your request by visiting our website at www.recochem.com.

Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.

Disclaimer

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

SAFETY DATA SHEET

Revision Date 04-Sep-2015 **Version** 3

1. IDENTIFICATION

Product identifier
Product Name Spray Nine® 4L

Other means of identification
Product Code C26804
Synonyms None

Recommended use of the chemical and restrictions on use
Recommended Use Disinfectant Cleaner
Uses advised against No information available

Details of the supplier of the safety data sheet

Manufacturer Address	**Distributor**
ITW Permatex	ITW Permatex Canada
10 Columbus Blvd.	35 Brownridge Road, Unit 1 Halton
Hartford, CT 06106 USA	Hills, ON Canada L7G 0C6
	Telephone: (800) 924-6994

Company Phone Number 1-87-Permatex
(877) 376-2839
24 Hour Emergency Phone Number Chem-Tel: 800-255-3924
International Emergency:
00+1+ 813-248-0585
Contract Number: MIS0003453

E-mail address mail@permatex.com

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

NOTE: This product is a consumer product and is labeled in accordance with the US Consumer Product Safety Commission regulations which take precedence over OSHA Hazard Communication labeling. The actual container label will not include the label elements below. The labeling below applies to industrial/professional products.

Label elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Clear **Physical state** Liquid **Odor** Citrus

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
- Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

substance(s)

Chemical Name	CAS No	Weight-%	Trade Secret
WATER	7732-18-5	60 - 100	*
ETHOXYLATED C9-C11 ALCOHOLS	68439-46-3	1 - 5	*
DIPROPYLENE GLYCOL MONONBUTYL ETHER	29911-28-2	1 - 5	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of first aid measures

General advice Get medical advice/attention if you feel unwell.

Eye contact 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.

Skin contact IF ON SKIN:. Wash skin with soap and water. If skin irritation persists, call a physician. Wash contaminated clothing before reuse.

Inhalation IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a physician.

Ingestion IF SWALLOWED:. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms See section 2 for more information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Carbon dioxide (CO2), Dry chemical, Foam

Unsuitable extinguishing media
None.

Specific hazards arising from the chemical
None in particular.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with eyes and skin.

Environmental precautions

Environmental precautions Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Ensure adequate ventilation. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin and eyes.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep from freezing.

Incompatible materials Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .
NIOSH IDLH Immediately Dangerous to Life or Health

Other Information Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Appropriate engineering controls

Engineering Controls Eyewash stations

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection Wear protective gloves and protective clothing.

Respiratory protection Use NIOSH-approved air-purifying respirator with organic vapor cartridge or canister, as

appropriate.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Clear
Odor	Citrus
Odor threshold	No information available

Property	**Values**	**Remarks**
pH	No information available	
Melting point / freezing point	No information available	
Boiling point / boiling range	100 °C / 212 °F	
Flash point	> 93 °C / > 200 °F	Tag Closed Cup
Evaporation rate	< 1	Butyl acetate = 1
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	18 mm Hg	
Vapor density	>1	Air = 1
Relative density	1.02 g/ml	
Water solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	<0.5%
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Excessive heat.

Incompatible materials
Strong oxidizing agents

Hazardous Decomposition Products
Carbon oxides

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation May cause irritation of respiratory tract.

Eye contact Contact with eyes may cause irritation. May cause redness and tearing of the eyes.

Skin contact May cause skin irritation and/or dermatitis.

Ingestion Ingestion may cause irritation to mucous membranes.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
WATER 7732-18-5	> 90 mL/kg (Rat)	-	-
ETHOXYLATED C9-C11 ALCOHOLS 68439-46-3	= 1378 mg/kg (Rat) = 1400 mg/kg (Rat)	> 2 g/kg (Rabbit)	-
DIPROPYLENE GLYCOL MONONBUTYL ETHER 29911-28-2	= 1620 µL/kg (Rat)	= 5860 µL/kg (Rabbit)	= 42.1 ppm (Rat) 4 h

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity No information available.

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 39421 mg/kg
ATEmix (dermal) 76980 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

3.17 % of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea
DIPROPYLENE GLYCOL MONONBUTYL ETHER 29911-28-2	-	841: 96 h Poecilia reticulata mg/L LC50 static	-

Persistence and degradability
No information available.

Bioaccumulation
No information available.

Mobility
No information available.

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

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

Contaminated packaging Do not reuse container.

US EPA Waste Number Not applicable

14. TRANSPORT INFORMATION

DOT
Proper shipping name: Not regulated

IATA
Proper shipping name: Not regulated

IMDG
Proper shipping name: Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Not determined
ENCS	Not determined
IECSC	Complies
KECL	Not determined
PICCS	Not determined
AICS	Not determined

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
ETHANOL - 64-17-5	Carcinogen Developmental

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
SODIUM HYDROXIDE 1310-73-2	X	X	X
ETHANOL 64-17-5	X	X	X

U.S. EPA Label Information
EPA Pesticide Registration Number 6659-3
EPA Statement
This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.

WHMIS Hazard Class
Non-controlled

NFPA	**Health hazards** 1	**Flammability** 1	**Instability** 0	-
HMIS	**Health hazards** 1	**Flammability** 1	**Physical hazards** 0	**Personal protection** B

NFPA (National Fire Protection Association)
HMIS (Hazardous Material Information System)

Revision Date 04-Sep-2015

Disclaimer
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.

End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier **Jump Start® Starting Fluid with Lubricity**

Other means of identification

Product code 05671

Recommended use Starting fluid

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufactured or sold by:

Company name CRC Industries, Inc.

Address 885 Louis Dr.
Warminster, PA 18974 US

Telephone

General Information 215-674-4300

Technical Assistance 800-521-3168

Customer Service 800-272-4620

24-Hour Emergency (CHEMTREC) 800-424-9300 (US)
703-527-3887 (International)

Website www.crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
	Gases under pressure	Compressed gas
Health hazards	Skin corrosion/irritation	Category 2
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 3

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Extremely flammable aerosol. Contains gas under pressure; may explode if heated. May be fatal if swallowed and enters airways. Causes skin irritation. May cause drowsiness or dizziness. Suspected of causing cancer. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Do not apply while equipment is energized. Pressurized container: Do not pierce or burn, even after use. Extinguish all flames, pilot lights and heaters. Vapors will accumulate readily and may ignite. Use only with adequate ventilation; maintain ventilation during use and until all vapors are gone. Open doors and windows or use other means to ensure a fresh air supply during use and while product is drying. If you experience any symptoms listed on this label, increase ventilation or leave the area. Avoid breathing mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Avoid release to the environment.

Response	If swallowed: Immediately call a poison center/doctor. Do NOT induce vomiting. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical attention. Take off contaminated clothing and wash before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell. If exposed or concerned: Get medical attention.
Storage	Store in a well-ventilated place. Store locked up. Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Exposure to high temperature may cause can to burst.
Disposal	Dispose of contents/container in accordance with local/regional/national regulations.
Hazard(s) not otherwise classified (HNOC)	None known.

Supplemental information

22.5% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Heptane, branched, cyclic and linear		426260-76-6	70 - 80
Diethyl Ether		60-29-7	10 - 20
Carbon Dioxide		124-38-9	5 - 10
Ethanol		64-17-5	< 1.5
Chloroethane		75-00-3	< 1
Distillates (petroleum), hydrotreated light		64742-47-8	< 1

Specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Remove contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Aspiration may cause pulmonary edema and pneumonitis. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Water spray. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Contents under pressure. Pressurized container may rupture when exposed to heat or flame. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire-fighting equipment/instructions	In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.
General fire hazards	Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Many vapors are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. This product is miscible in water. Stop the flow of material, if this is without risk. Prevent product from entering drains. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Use caution around energized equipment. The metal container will conduct electricity if it contacts a live source. This may result in injury to the user from electrical shock and/or flash fire. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices. Avoid release to the environment. For product usage instructions, please see the product label.

Conditions for safe storage, including any incompatibilities

Level 3 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Carbon Dioxide (CAS 124-38-9)	PEL	9000 mg/m3 5000 ppm
Chloroethane (CAS 75-00-3)	PEL	2600 mg/m3 1000 ppm
Diethyl Ether (CAS 60-29-7)	PEL	1200 mg/m3 400 ppm
Ethanol (CAS 64-17-5)	PEL	1900 mg/m3 1000 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
~~Ethanol (CAS 64-17-5)~~		
Carbon Dioxide (CAS 124-38-9)		
Chloroethane (CAS 75-00-3)		
Diethyl Ether (CAS 60-29-7)		

STEL	30000 ppm
TWA	5000 ppm
TWA	100 ppm
STEL	500 ppm
TWA	400 ppm
STEL	1000 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Carbon Dioxide (CAS 124-38-9)	STEL	54000 mg/m3
		30000 ppm
	TWA	9000 mg/m3
		5000 ppm
Distillates (petroleum), hydrotreated light (CAS 64742-47-8)	TWA	100 mg/m3
Ethanol (CAS 64-17-5)	TWA	1900 mg/m3
		1000 ppm

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

Exposure guidelines

US - California OELs: Skin designation

Chloroethane (CAS 75-00-3) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Chloroethane (CAS 75-00-3) Can be absorbed through the skin.

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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Butyl rubber.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using do not smoke. 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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Aerosol.

Color Colorless.

Odor Hydrocarbon-like.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -189.9 °F (-123.3 °C) estimated

Initial boiling point and boiling range 94.3 °F (34.6 °C) estimated

Flash point < 20 °F (< -6.7 °C) Tag Closed Cup

Evaporation rate Fast.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 0.5 % estimated

Flammability limit - upper (%) 36.5 % estimated

Vapor pressure	5024.7 hPa estimated
Vapor density	> 1 (air = 1)
Relative density	0.7
Solubility (water)	Slightly soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	320 °F (160 °C) estimated
Decomposition temperature	Not available.
Viscosity (kinematic)	< 20 cSt (104 °F (40 °C))
Percent volatile	100 %

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Direct sunlight. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Amines. Nitric acids.
Hazardous decomposition products	Carbon oxides. Acrid smoke.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Headache. May cause drowsiness and dizziness. Nausea, vomiting. Aspiration may cause pulmonary edema and pneumonitis. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Narcotic effects.

Product	Species	Test Results
Jump Start® Starting Fluid with Lubricity		
Acute		
Dermal		
LD50	Rabbit	2667 mg/kg estimated
Inhalation		
LC0	Rat	15588 mg/l, 4 hours estimated
LC50	Rat	74 mg/l, 4 hours estimated
Oral		
LD50	Rat	5032 mg/kg estimated

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation. Repeated exposure may cause skin dryness or cracking.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Suspected of causing cancer.

ACGIH Carcinogens

Chloroethane (CAS 75-00-3)	Confirmed animal carcinogen with unknown relevance to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Chloroethane (CAS 75-00-3)	3 Not classifiable as to carcinogenicity to humans.
Diethyl Ether (CAS 60-29-7)	3 Not classifiable as to carcinogenicity to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

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

Specific target organ toxicity - single exposure May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed and enters airways. If aspirated into lungs during swallowing or vomiting, may cause chemical pneumonia, pulmonary injury or death.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Product		Species	Test Results
Jump Start® Starting Fluid with Lubricity			
Aquatic			
Fish	LC50	Fish	49850.1406 mg/l, 96 hours estimated
Acute			
Crustacea	EC50	Daphnia	1181.25 mg/l, 48 hours estimated

Components		Species	Test Results
Diethyl Ether (CAS 60-29-7)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2560 mg/l, 96 hours
Distillates (petroleum), hydrotreated light (CAS 64742-47-8)			
Aquatic			
Acute			
Fish	LC50	Fathead minnow (Pimephales promelas)	45 mg/l, 96 hours
Ethanol (CAS 64-17-5)			
Aquatic			
Acute			
Algae	EC50	Green algae (Chlorella kessleri)	1450 mg/l
Crustacea	EC50	Water flea (Daphnia magna)	11.2 mg/l, 48 hours
			7.7 - 11.2 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	15300 mg/l, 96 hours
			> 100 mg/l, 96 hours
			> 100 mg/l, 96 hours
		Rainbow trout,donaldson trout (Oncorhynchus mykiss)	13000 - 15300 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Chloroethane	1.43
Diethyl Ether	0.89
Ethanol	-0.31

Mobility in soil No data available.

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 of waste from residues / unused products	If discarded, this product is considered a RCRA ignitable waste, D001. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Contents under pressure. Do not puncture, incinerate or crush. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose in accordance with all applicable regulations.
Hazardous waste code	D001: Waste Flammable material with a flash point <140 F
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1950
UN proper shipping name	Aerosols, flammable, n.o.s. (engine starting fluid), Limited Quantity
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Label(s)	2.1
Packing group	Not applicable.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	N82
Packaging exceptions	306
Packaging non bulk	304
Packaging bulk	None

IATA

UN number	UN1950
UN proper shipping name	Aerosols, flammable (engine starting fluid)
Transport hazard class(es)	
Class	2.1
Subsidiary risk	-
Packing group	Not applicable.
Environmental hazards	No.
ERG Code	10L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Forbidden
Cargo aircraft only	Allowed.

IMDG

UN number	UN1950
UN proper shipping name	AEROSOLS, LIMITED QUANTITY
Transport hazard class(es)	
Class	2
Subsidiary risk	-
Packing group	Not applicable.
Environmental hazards	
Marine pollutant	No.
EmS	F-D, S-U
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

15. Regulatory information

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

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

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

SARA 304 Emergency release notification

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Chloroethane (CAS 75-00-3)

CERCLA Hazardous Substance List (40 CFR 302.4)

Diethyl Ether (CAS 60-29-7) Listed.

CERCLA Hazardous Substances: Reportable quantity

Diethyl Ether (CAS 60-29-7) 100 LBS

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

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)

Chloroethane (CAS 75-00-3)
Diethyl Ether (CAS 60-29-7)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Diethyl Ether (CAS 60-29-7) 6584

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Diethyl Ether (CAS 60-29-7) 35 %WV

DEA Exempt Chemical Mixtures Code Number

Diethyl Ether (CAS 60-29-7) 6584

Food and Drug Administration (FDA) Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance No

US state regulations

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Chloroethane (CAS 75-00-3)
Distillates (petroleum), hydrotreated light (CAS 64742-47-8)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

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

Carbon Dioxide (CAS 124-38-9)
Diethyl Ether (CAS 60-29-7)
Ethanol (CAS 64-17-5)

US. Massachusetts RTK - Substance List

Carbon Dioxide (CAS 124-38-9)
Diethyl Ether (CAS 60-29-7)

US. Pennsylvania Worker and Community Right-to-Know Law

Diethyl Ether (CAS 60-29-7)
Chloroethane (CAS 75-00-3)
Carbon Dioxide (CAS 124-38-9)

US. Rhode Island RTK

Diethyl Ether (CAS 60-29-7)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Chloroethane (CAS 75-00-3) Listed: July 1, 1990

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Toluene (CAS 108-88-3) Listed: January 1, 1991

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Toluene (CAS 108-88-3) Listed: August 7, 2009

Volatile organic compounds (VOC) regulations

EPA

VOC content (40 CFR 51.100(s))	94.5 %
Consumer products (40 CFR 59, Subpt. C)	Not regulated

State

Consumer products	Not regulated
VOC content (CA)	94.5 %
VOC content (OTC)	94.5 %

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
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 revision

Issue date	07-24-2015
Revision date	08-13-2015
Prepared by	Allison Cho
Version #	02
Further information	Not available.
HMIS® ratings	Health: 1* Flammability: 4 Physical hazard: 0 Personal protection: B
NFPA ratings	Health: 1 Flammability: 4 Instability: 0
NFPA ratings	

Disclaimer

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Industries.

Safety Data Sheet



1 - Identification

Trade Name: WD-40 Aerosol **Product Use:** Lubricant, Penetrant, Drives Out Moisture, Removes and Protects Surfaces From Corrosion **Restrictions on Use:** None identified **SDS Date Of Preparation:** November 15, 2016	**Canadian Office:** WD-40 Products [Canada] Ltd. P.O. Box 220 Toronto, Ontario M9C 4V3 **Information Phone #:** (416) 622-9881 **Emergency Phone # 24 hr:** Canutec: (613) 996-6666 - Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or accident involving chemicals

2 – Hazards Identification

WHMIS 2015/GHS Classification:
Flammable Aerosol Category 1
Gas Under Pressure: Compressed Gas
Aspiration Toxicity Category 1
Specific Target Organ Toxicity Single Exposure Category 3 (nervous system effects)

Note: This product is a consumer product and is labeled in accordance with the Consumer Chemicals and Containers Regulations (CCCR) which take precedence over WHMIS 2015 labeling. The actual container label will not include the label elements below. The labeling below applies to industrial/professional products.

Label Elements:



DANGER!
Extremely flammable aerosol.
Contains gas under pressure; may explode if heated.
May be fatal if swallowed and enters airways.
May cause drowsiness or dizziness.

Prevention
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Do not spray on an open flame or other ignition source.
Do not pierce or burn, even after use.
Avoid breathing mist or vapors.
Use only outdoors or in a well-ventilated area.
Response
IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor if you fell unwell.
Storage
Store locked up.
Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F. Store in a well-ventilated place.
Disposal

Dispose of contents and container in accordance with local and national regulations.

3 - Composition/Information on Ingredients

Ingredient	CAS #	Weight Percent	WHMIS 2015/ GHS Classification
Aliphatic Hydrocarbon	64742-47-8	50-70%	Flammable Liquid Category 3 Aspiration Toxicity Category 1 Specific Target Organ Toxicity Single Exposure Category 3 (nervous system effects)
Petroleum Base Oil	64742-56-9 64742-65-0 64742-53-6 64742-54-7 64742-71-8	30-35%	Not Hazardous
Carbon Dioxide	124-38-9	2-3%	Simple Asphyxiant

4 – First Aid Measures

Ingestion (Swallowed): Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.
Eye Contact: Flush thoroughly with water. Remove contact lenses if present after the first 5 minutes and continue flushing for several more minutes. Get medical attention if irritation persists.
Skin Contact: Wash with soap and water. If irritation develops and persists, get medical attention.
Inhalation (Breathing): If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.
Signs and Symptoms of Exposure: Harmful or fatal is swallowed. If swallowed, may be aspirated and cause lung damage. May cause eye irritation. Inhalation of mists or vapors may cause nasal and respiratory tract irritation and central nervous system effects such as headache, dizziness and nausea. Skin contact may cause drying of the skin.
Indication of Immediate Medical Attention/Special Treatment Needed: Immediate medical attention is needed for ingestion.

5 – Fire Fighting Measures

Suitable (and unsuitable) Extinguishing Media: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.
Specific Hazards Arising from the Chemical: Contents under pressure. Keep away from ignition sources and open flames. Exposure of containers to extreme heat and flames can cause them to rupture often with violent force. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Combustion will produce oxides of carbon and hydrocarbons.
Special Protective Equipment and Precautions for Fire-Fighters: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water. Use shielding to protect against bursting containers.

6 – Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area.
Methods and Materials for Containment/Cleanup: Leaking cans should be placed in a plastic bag or open pail until the pressure has dissipated. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

7 – Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use only with adequate ventilation. Keep away from heat, sparks, pilot lights, hot surfaces and open flames. Unplug electrical tools, motors and appliances before spraying or bringing the can near any source of electricity. Electricity can burn a hole in the can and cause contents to burst into flames. To avoid

serious burn injury, do not let the can touch battery terminals, electrical connections on motors or appliances or any other source of electricity. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children. Do not puncture, crush or incinerate containers, even when empty.
Conditions for Safe Storage: Store in a cool, well-ventilated area, away from incompatible materials Do not store above 120°F or in direct sunlight. U.F.C (NFPA 30B) Level 3 Aerosol. Store away from oxidizers.

8 – Exposure Controls/Personal Protection

Chemical	Occupational Exposure limits
Aliphatic Hydrocarbon	1200 mg/m3 TWA (manufacturer recommended)
Petroleum Base Oil	5 mg/m3 TWA (Inhalable) ACGIH TLV (as mineral oil) 5 mg/m3 TWA, 10 mg/m3 STEL Canada- Québec (as oil mist, mineral) 5 mg/m3 TWA, 10 mg/m3 STEL Canada- Ontario (as oil mist, mineral) 1 mg/m3 TWA British Columbia (as Oil mist-mineral, severely refined)
Carbon Dioxide	5000 ppm TWA, 30000 ppm STEL ACGIH TLV 5000 ppm TWA, 30000 ppm STEL Canada- Ontario 5000 ppm TWA, 30000 ppm STEL Canada- Québec 5000 ppm TWA. 15000 ppm STEL British Columbia

The Following Controls are Recommended for Normal Consumer Use of this Product
Appropriate Engineering Controls: Use in a well-ventilated area.
Personal Protection:
Eye Protection: Avoid eye contact. Always spray away from your face.
Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.
Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended
Appropriate Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.
Personal Protection:
Eye Protection: Safety goggles recommended where eye contact is possible.
Skin Protection: Wear chemical resistant gloves.
Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.
Work/Hygiene Practices: Wash with soap and water after handling.

9 – Physical and Chemical Properties

Appearance:	Light amber liquid	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8%
Odor:	Mild petroleum odor	Vapor Pressure:	95-115 PSI @ 70°F
Odor Threshold:	Not established	Vapor Density:	Greater than 1 (air=1)
pH:	Not Applicable	Relative Density:	0.8 – 0.82 @ 60°F
Melting/Freezing Point:	Not established	Solubilities:	Insoluble in water
Boiling Point/Range:	361 - 369°F (183 - 187°C)	Partition Coefficient; n-octanol/water:	Not established
Flash Point:	122°F (49°C) Tag Open Cup (liquid)	Autoignition Temperature:	Not established
Evaporation Rate:	Not established	Decomposition Temperature:	Not established
Flammability (solid, gas):	Flammable Aerosol	Viscosity:	2.79-2.96 cSt @ 100°F
VOC:	65%	Pour Point:	-63°C (-81.4°F) ASTM D-97

10 – Stability and Reactivity

Reactivity: Not reactive under normal conditions
Chemical Stability: Stable
Possibility of Hazardous Reactions: May react with strong oxidizers generating heat.
Conditions to Avoid: Avoid heat, sparks, flames and other sources of ignition. Do not puncture or incinerate containers.
Incompatible Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide and carbon dioxide.

11 – Toxicological Information

Symptoms of Overexposure:
Inhalation: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.
Skin Contact: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.
Eye Contact: Contact may be irritating to eyes. May cause redness and tearing.
Ingestion: This product has low oral toxicity. Swallowing may cause gastrointestinal irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis, severe lung damage and death.
Chronic Effects: None expected.
Carcinogen Status: None of the components are listed as a carcinogen or suspect carcinogen by IARC, NTP, ACGIH or OSHA.
Reproductive Toxicity: None of the components is considered a reproductive hazard.

Numerical Measures of Toxicity:
Acute Toxicity Estimates: Oral > 5,000 mg/kg; Dermal >2,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.

12 – Ecological Information

Ecotoxicity: No specific aquatic toxicity data is currently available; however components of this product are not expected to be harmful to aquatic organisms
Persistence and Degradability: Components are readily biodegradable.
Bioaccumulative Potential: Bioaccumulation is not expected based on an assessment of the ingredients.
Mobility in Soil: No data available
Other Adverse Effects: None known

13 - Disposal Considerations

Aerosol containers should not be punctured, compacted in home trash compactors or incinerated. Empty containers may be disposed of through normal waste management options. Dispose of all waste product, absorbents, and other materials in accordance with applicable Federal, state and local regulations.

14 – Transportation Information

DOT Surface Shipping Description: UN1950, Aerosols, 2.1 Ltd. Qty
(Note: Shipping Papers are not required for Limited Quantities unless transported by air or vessel – each package must be marked with the Limited Quantity Mark)
Canadian TDG Classification: Limited Quantity
IMDG Shipping Description: Un1950, Aerosols, 2.1, LTD QTY
ICAO Shipping Description: UN1950, Aerosols, flammable, 2.1

NOTE: WD-40 Company does not test aerosol cans to assure that they meet the pressure and other requirements for transport by air. We do not recommend that our aerosol products be transported by air.

15 – Regulatory Information

National Pollutant Release Inventory (NPRI): This product contains the following chemicals that are listed on the NPRI Substance List: Aliphatic Hydrocarbon (64742-47-8) 50-70%

Canadian Environmental Protection Act: All of the ingredients are listed on the Canadian Domestic Substances List or exempt from notification.

16 – Other Information

HMIS Hazard Rating:
Health – 1 (slight hazard), Fire Hazard – 4 (severe hazard), Physical Hazard – 0 (minimal hazard)

Revision Date: November 15, 2016 Supersedes: March 27, 2014

Prepared by: Industrial Health & Safety Consultants, Inc. Shelton, CT, USA

Reviewed by: I. Kowalski Regulatory Affairs Dept.

1014100/No.0084103

WINDSHIELD WASH -45°C

SECTION 1. IDENTIFICATION

Product Identifier	WINDSHIELD WASH -45°C
Other Means of Identification	15-403SLV, 15-403SLV-PRO, 15-404, 15-408, 35-208SO, 35-306GP, 35-309OPW-1K, 35-404BMW, 35-404E, 35-404LIFE, 35-404MER, 35-404PC, 35-404REF, 35-404U/N, 35-404UFA, 35-408HUS, 35-408SL, 35-404CT
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	1575

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid - Category 3; Acute toxicity (Oral) - Category 3; Acute toxicity (Dermal) - Category 3; Acute toxicity (Inhalation) - Category 3; Specific target organ toxicity (single exposure) - Category 1

GHS Label Elements



Signal Word:
Danger

Hazard Statement(s):

H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs (eyes) if swallowed.

Precautionary Statement(s):

Prevention:

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.
P260	Do not breathe fume, mist, vapours, spray.
P264	Wash hands and skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing.

Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE/doctor.
P330 Rinse mouth.
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.
P363 Wash contaminated clothing before reuse.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P321 Specific treatment (see supplemental first aid instruction on this label).
P370 + P378 In case of fire: Use appropriate foam, carbon dioxide, dry chemical powder, water spray or fog to extinguish.

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.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Methanol	67-56-1	30-60	

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

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. If breathing has stopped, trained personnel should begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Get medical advice/attention if you feel unwell or are concerned.

Skin Contact

Avoid direct contact. Wear chemical protective clothing if necessary. Take off immediately 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. Get medical advice/attention if you feel unwell or are concerned. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Avoid direct contact. Wear chemical protective gloves if necessary. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. If eye irritation persists, get medical advice/attention.

Ingestion

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. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor. Treatment is urgently required.

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, liver, nervous system.

Special Instructions

Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complaints. Treatment with ipecac or lavage is indicated in any patient presenting within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.

Medical Conditions Aggravated by Exposure

Respiratory conditions.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder or appropriate foam. Special "alcohol resistant fire-fighting foams".

Unsuitable Extinguishing Media

Water is not effective for extinguishing a fire. It may not cool product below its flash point.

Specific Hazards Arising from the Chemical

Highly 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. Even dilute solutions in water may be flammable. May travel a considerable distance to a source of ignition and flash back to a leak or open container. See Section 9 (Physical and Chemical Properties) for flash point and explosive limits. Burns with an invisible flame. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a fire hazard.
In a fire, the following hazardous materials may be generated: toxic chemicals; very toxic carbon monoxide, carbon dioxide; very toxic, flammable formaldehyde.

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

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. 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. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient. Distant ignition and flashback are possible.

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

	ACGIH TLV®		OSHA PEL		AIHA WEEL	
Chemical Name	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Methanol	200 ppm	250 ppm	200 ppm	250 ppm		

Appropriate Engineering Controls

General ventilation is usually adequate. For large scale use of this product: do not allow product to accumulate in the air in work or storage areas, or in confined spaces. Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof 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 safety shower in work area, 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.
Nitrile rubber.

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 organic vapour cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Clear Purple liquid.
Odour	Pungent
Odour Threshold	Not available
pH	8 - 11 (100% solution)
Melting Point/Freezing Point	Not available (melting); -45 ºC (-49 ºF) (freezing)
Initial Boiling Point/Range	Not available
Flash Point	27.7 ºC (81.9 ºF) (closed cup)
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	0.90 - 0.97 at 20 ºC
Solubility	Soluble in water; Soluble in all proportions in alcohols (e.g. ethanol).
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)

Other Information

Physical State	Liquid
Molecular Weight	Not available

SECTION 10. STABILITY AND REACTIVITY

Reactivity

None known.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None known.

Conditions to Avoid

Heat. Open flames, sparks, static discharge, heat and other ignition sources.

Incompatible Materials

Slightly reactive or incompatible with the following materials: oxidizing agents (e.g. peroxides), strong acids (e.g. hydrochloric acid), strong bases (e.g. sodium hydroxide).
Not corrosive to metals.

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide; very toxic, flammable formaldehyde.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Ingestion; eye contact; skin contact; inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Methanol	83867.5 mg/m3 (rat) (4-hour exposure)	5628 mg/kg (rat)	15800 mg/kg (rabbit)

LC50: Not applicable.

LD50 (oral): Not applicable.

LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

Human experience shows very mild irritation.

Serious Eye Damage/Irritation

Animal tests show serious eye irritation.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

At high concentrations severe nose and throat irritation.

Skin Absorption

May be harmful based on animal tests.

Ingestion

Toxic, can cause death depression of the central nervous system, impaired vision and blindness. In some cases, there may be delayed effects on the nervous system. Symptoms may include headache, nausea, vomiting, dizziness, drowsiness and confusion. A severe exposure may cause stomach pain, muscle pain, difficult breathing and coma. Vision can be impaired and permanent blindness can result. There may be other permanent effects on the nervous system e.g. tremor, seizures.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

If swallowed: liver function tests may show abnormal results.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Methanol	Not Listed	Not designated	Not Listed	Not Listed

May cause cancer based on animal studies.

Reproductive Toxicity

Development of Offspring

Animal studies show effects on the offspring. If inhaled: known to cause: decreased weight, birth defects. Teratogenic(external, soft tissue and skeletal defects) embryotoxic (late resorptions).

Sexual Function and Fertility

Not known to cause effects on sexual function or fertility.

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

Conclusions cannot be drawn from the limited studies available.

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
Methanol	15400 mg/L (Lepomis macrochirus (bluegill); 96-hour)	10000 mg/L (Daphnia magna (water flea); 48-hour)		

Chronic Aquatic Toxicity

Chemical Name	NOEC Fish	EC50 Fish	NOEC Crustacea	EC50 Crustacea
Methanol	7900 mg/L (Lepomis macrochirus (bluegill); 200-hrs)			

Persistence and Degradability

Degrades rapidly based on quantitative tests.

Bioaccumulative Potential

This product and its degradation products are not expected to bioaccumulate.

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	1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. (Methanol)	3 (6.1)	III
US DOT	1986	ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. (Methanol)	3 (6.1)	III

Environmental Hazards	Not applicable
Special Precautions for User	Please note: In containers of 450L or less, this product meets the requirements for exemption under TDG regulation special provisions, part 1, section 1.36b: Class 3, Flammable liquids: Alcohol Exemption.

In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under DOT regulations.

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

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 birth defects.

SECTION 16. OTHER INFORMATION

SDS Prepared By	Compliance and Regulatory Department
Phone No.	905-878-5544
Date of Preparation	October 19, 2015
Additional Information	We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative. Please send us your request by visiting our website at www.recochem.com. Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.
Disclaimer	Notice to reader: To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET
Sodium Cyanide Solid

ABN: 81 008 668 371

Section 1 – Identification of the Material and Supplier

Product Name
Sodium Cyanide Solid

Other names
Sodium cyanide, hydrocyanic acid sodium salt. Company product 1380.

Recommended use
Electroplating, Gold processing reagent, laboratory reagent, metal treatment.

Company name
Australian Gold Reagents Pty Ltd

Address	State	Postcode
Kwinana Beach Road, KWINANA	Western Australia	6167

Telephone number	Emergency telephone number
(08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas)	1800 093 333 (Australia), +61 8 9411 8444

Section 2 – Hazard Identification

Hazard Classification, including a statement of overall hazardous nature

HAZARDOUS SUBSTANCE

Sodium cyanide solid is classified as hazardous according to Australian WHS Regulations.

DANGEROUS GOODS

Sodium cyanide solid is classified for physicochemical hazards and specified as dangerous in the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code), 7th Edition.

GHS classification(s)

Acute Toxicity: Oral: Category 2
Acute Toxicity: Dermal: Category 1
Acute Toxicity: Inhalation: Category 2
Skin Corrosion/Irritation: Category 2
Serious Eye Damage/Eye Irritation: Category 1
Specific Target Organ Toxicity (Repeated Exposure): Category 1
Aquatic Hazard (Chronic): Category 1
Aquatic Hazard (Acute): Category 1

Label Elements

Signal word **DANGER**

Pictograms(s)



Hazard statement(s)

H300	Fatal if swallowed.
H310	Fatal in contact with skin.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H330	Fatal if inhaled.

H372	Causes damage through organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
AUH032	Contact with acids liberates very toxic gas.

Prevention statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P262	Do not get in eyes, on skin or on clothing.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Wear respiratory protection.

Response statement(s)

P301 + P310	IF SWALLOWED: immediately call a POSION CENTER or doctor/physician.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at a rest position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or a doctor/physician.
P314	Get medical advice/attention if you feel unwell.
P320	Specific treatment is urgent – see first aid instructions.
P330	Rinse mouth.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before re-use.
P391	Collect spillage

Storage statement(s)

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.

Other hazards

No information provided.

Section 3 – Composition/Information on Ingredients

Chemical identity of ingredients	Proportion of ingredients	CAS Number for ingredients
Sodium cyanide	98% +/- 1% ($^{wt}/_{wt}$)	143-33-9
Sodium carbonate	0.8% +/- 0.4% ($^{wt}/_{wt}$)	497-19-8
Other	Remainder	-

Section 4 – First Aid Measures

First Aid

TO BE EFFECTIVE, FIRST AID MUST BE PROMPT.

SODIUM CYANIDE SOLID IS POISONOUS BY INGESTION AND INHALATION OF ITS DUST. CONTACT WITH SKIN AND EYES AND MAY CAUSE IRRITATION OF THE SKIN AND EYES AND POISONING SYMPTOMS SIMILAR TO THOSE FOR INGESTION.

OF PRIME IMPORTANCE IS THE PROTECTION OF THE RESCUER. NO ATTEMPT AT RESCUE SHOULD BE PERFORMED UNTIL AN APPROPRIATE HAZARD ASSESMENT OF THE EXPOSURE SITE IS MADE AND APPROPRIATE PERSONAL PROTECTION EQUIPMENT AND PERSONNEL ARE IN PLACE.

FIRST AID ATTENTION MUST BE GIVEN AS URGENTLY AS POSSIBLE AS OUTLINED BELOW. ALL SUSPECTED SODIUM CYANIDE INGESTION, INHALATION AND CONTACT SHOULD RECEIVE MEDICAL ATTENTION. TRAINING ON HANDLING SODIUM CYANIDE INCIDENTS USING THIS MSDS SHOULD BE PROVIDED BEFORE ANY SODIUM CYANIDE HANDLING OR USE COMMENCES.

First Aid Facilities

First aid procedures, equipment, medication and training for the treatment of exposure to sodium cyanide should be in place BEFORE the use commences. First aid personnel should be aware of the nearest hospitals which are familiar with the treatment of sodium cyanide exposure.

Equipment and medication in place should be:

Safety shower and eyewash stations immediately accessible in the workplace;

Eye-wash bottle;

Personal protective equipment for use by first aid personnel;

Fresh, clean, cool drinking water;

Resuscitation bag and mask (or Oxy-Viva);

Cyanide Emergency Kit: containing Amyl Nitrite Pearls; Hydroxycobalamine and Sodium Thiosulfate;

Oxygen;

"Space" or thermal blankets for treating patients for shock.

FIRST AID PROCEDURES FOR DEALING WITH THIS PRODUCT AND EXPOSURE TO IT

1. Personal Protection By First Aid Personnel

First aid personnel providing first aid treatment to a patient exposed to sodium cyanide solid should observe the following precautions for their own personal protection:

- Avoid contact with contaminated skin, clothing and equipment by wearing protective gloves;
- Wear chemical goggles as a minimum level of eye protection to prevent sodium cyanide dust entering eyes;
- Avoid inhalation of sodium cyanide dust during rescue in contaminate areas by wearing suitable respiratory protection;
- Respiratory protection suggested is: an air supplied breathing apparatus, or positive pressure self-contained breathing apparatus.

2. Swallowed

Immediately:

- Remove the patient from the source of contamination – to fresh air, if hydrogen cyanide gas (HCN) is present;
- If the patient is not breathing, do not use mouth to mouth, or mouth to nose ventilation, because of the danger to the rescuer, instead use a resuscitation bag and mask – (Oxy-Viva);
- If pulse is absent, start external cardiac massage and follow standard Advanced Cardiovascular Life Support (ACLS) guidelines;

- Give 100% oxygen by mask (Oxy-Viva) if available;

2. Swallowed (cont..)

- Remove all contaminated clothing and footwear into a sealable collection bag – launder contaminated clothing thoroughly and wash the affected areas with soap and copious amounts of water;
- Arrange for the urgent transfer of the patient, accompanied by an attendant with the Cyanide Emergency Kit, to medical professionals;
- Those persons designated as competent may open the Cyanide Emergency Kit and commence use of any amyl nitrite pearls to treat the effects of cyanide exposure.

Amyl Nitrite should not be used unless the patient is clearly deteriorating, despite oxygen administration, and there is a reasonable confidence that cyanide intoxication is the cause.

3. Eyes

Persons with potential eye exposure should not wear contact lenses.
Immediately irrigate eye with copious amounts of water, while holding eyelids open, for at least 15 minutes.
Seek medical assistance immediately.

4. Skin

Wash affected area with copious amounts of water for at least 15 minutes.
Remove contaminated clothing and launder before re-use.
Seek medical assistance following skin contact.

5. Inhalation

Proceed as for **2. Swallowed** above.

ADVICE TO DOCTOR.

Treatment should include the following measures:

- Immediate attention should be directed towards administration of 100 % oxygen, assisted ventilation if required, insertion of intravenous lines and institution of cardiac monitoring, if available;
- Attention should be given to monitoring the level of consciousness;
- Administer antidote if signs of serious cyanide poisoning are present:
  - Insert indwelling cannula into vein:
  - Take 5 mL of blood in a plain clotted tube (red top in Western Australia) for later confirmation of diagnosis by measurement of the cyanide level. (Take blood in a heparinised tube and place on ice for immediate transfer to laboratory if direct testing for cyanide levels is available). At the same time take blood for lactic acid level (urgent). An elevated lactic acid level is a useful test to assist in confirmation of the diagnosis.

    Note: Cyanide poisoning is a clinical diagnosis and treatment is instigated on clinical grounds.
- Treatment path
  - Administer intravenously 5 to 15 grams of hydroxycobalamine over 30 minutes, or faster if necessary. In the Cyanide Emergency Kit these are made up of two 2·5 gram doses that are set to be re-constituted with the saline in the plastic transfer device. An IV giving set is to be inserted into the re-constituted IV hydroxycobalamine bottle. If this has been left in the cardboard packet, it can be hung like an IV bottle through the hole in the top of the box;
  - Also administer sodium thiosulfate 12·5 grams over 10 to 20 minutes with the hydroxycobalamine;

    Note: Hydroxycobalamine is the recommended treatment in patients in whom the diagnosis is not clear and where there is a clinical suspicion of cyanide poisoning.
  - If cyanide has been swallowed, whilst gastric lavage, charcoal and cathartics may be used after an antidote therapy, if less than two hours have passed since ingestion, there is little evidence to support a benefit and one should take the advice of an emergency care physicians prior to commencing;
  - specialist medical advice for ongoing management after the administration of antidotes is

required with prompt referral of the patient to a tertiary medical facility;

Note: The best way to treat metabolic and cardiorespiratory complications of cyanide poisoning is the use of an appropriate antidote.

Supportive care should include the following measures:

- All patients with suspected, or proven, cyanide poisoning should be taken to hospital for evaluation and observation:
- Follow the patient's progress for at least 24 hours;
- Watch for the development for pulmonary oedema and aspiration pneumonia in comatose patients;
- Consider more antidote if there is a persistent metabolic acidosis. Bicarbonate can be used cautiously. Correct metabolic acidosis with bicarbonate when blood pH falls below 7·20, and be sure to correct electrolyte imbalance (for example, hyperkalemia, hypercalcemia);
- Oxygen requirement would be expected to decrease after successful administration of the antidote.

Long Term Complications

No data available.

Further information about the treatment for exposure to this product can be obtained from the Poisons Information Centre on (08) 13 1126 (Australia only)

Section 5 – Fire Fighting Measures

Product flammability

Sodium cyanide solid is not combustible and is not considered a fire risk, but may generate toxic, flammable, corrosive and explosive hydrogen cyanide gas if in contact with water, CO_2 fire extinguishers, and some foam fire extinguishers if these contain acidic agents.

Suitable extinguishing media

DO NOT USE CARBON DIOXIDE. Extinguish fires with water spray or fog. Do not use straight stream of water. Most foams will react with sodium cyanide solid and release toxic and corrosive fumes. For small fires use dry chemical extinguishers or dry sand.

Hazard from combustion products

Although sodium cyanide itself is not combustible, intense heat may cause sodium cyanide to decompose, giving off toxic, flammable, corrosive and explosive hydrogen cyanide gas.

Special protective precautions and equipment for fire fighters

Wear full body protective clothing (PVC jackets and pants, PVC gloves and chemical resistant boots) with self-contained breathing apparatus with a full-face piece operated in pressure-demand or positive pressure mode. Prevent spillage from entering drains or waterways. Consider evacuation. Use water to control fire. Wet sodium cyanide spill will cause surfaces to be slippery and slimy. If required, use soda ash, or other suitable alkaline material, to control the pH of the water/cyanide mixture created. If safe and practicable to do so remove sodium cyanide containers from path of fire.

Equipment should be thoroughly decontaminated after use.

After intervention, take shower, remove clothing carefully, clean and check equipment.

Hazchem Code

2X

Section 6 – Accidental Release Measures

Emergency procedures

The hazardous nature of sodium cyanide, require emergency and spill procedures to be effective to avoid both human and environmental exposure. Hazardous conditions may result if material is managed improperly. Make plans in advance to handle possible emergencies, including obtaining stocks of absorbent materials.

Always wear recommended personal protective equipment and respiratory protection. Good ventilation is necessary.

Methods and Materials for containment and clean up

For **ALL** spills, evacuate unprotected personnel upwind and out of danger. Wear appropriate personal protective equipment and breathing apparatus. If safe to do so, prevent further release of sodium cyanide. Shut off all possible sources of ignition. Stay upwind of any dust or mist released. Increase ventilation and allow any dust or mist released to vent to a safe area. Restrict access to spill site. Avoid, or minimise, the use of water on spilt solid or dust. Using a shovel/front end loader as required, recover as much material as possible into dedicated drums, and where possible return collected spills to process, or manufacturer. If possible contain the surface area of a sodium cyanide solid spill by bunding with sand, earth or vermiculite.

Initial Clean Up With Ferrous Sulfate

Generously cover any remaining residue with lime or soda ash (to maintain pH at 9 or higher), add ferrous sulfate then add water and mix well. Allow about 30 minutes for complete penetration and neutralisation to take effect. Collect residue and store in dedicated container for disposal. Prevent run-off into drains and waterways. After clean up, test area for free cyanide level present; if free cyanide is more than 10 parts per million (ppm), repeat clean up using ferrous sulfate; if free cyanide is less than 10 ppm proceed with final clean up using hypochlorite solution.

Final Clean Up With Calcium/Sodium Hypochlorite

Make up a dilute aqueous chlorine solution using either calcium hypochlorite or sodium hypochlorite. Spray this chlorine solution evenly to the area to be decontaminated. After thorough contact of the chlorine solution with the contaminated area is made, test area for free cyanide present. If free cyanide is more than 1 ppm, repeat clean up using chlorine solution. Prevent run-off into drains and waterways.

For a large spill notify Fire and Rescue Services then CSBP Emergency Response.

Dispose of all neutralised solutions in accordance with the requirements of the Department of Environment Protection.

For the management of cyanide emergencies during transport by road or rail, SAA/SNZ HB76: Dangerous Goods-Initial Response Guide, Guide 40 should be consulted. This Guide should be carried at all times when sodium cyanide is being transported.

Clean up personnel will need personal full protection equipment and respiratory protection. Portable safety shower and eyewash facilities may also be needed for clean up personnel. Bags of ferrous sulfate neutralising agent, calcium/sodium hypochlorite drums, bags of soda ash, or other suitable alkaline material, chemical absorbent and substantial amounts of water will be required for large spill. A front-end loader may be required to scoop up neutralised cyanide/lime/soda ash residue, as are dedicated empty drums to store the neutralised residue.

Section 7 – Handling and Storage

Precautions for safe handling

Regulated dangerous goods as Class 6.1 Toxic. Proper protective clothing must be worn that covers the body including the face. A safety shower and eyewash should be available. Do not breathe dust or mist. Avoid contact with skin, eyes and clothing.

Do not smoke anywhere near the storage and handling of sodium cyanide solid or associated handling equipment.

Do not touch damaged containers or spilled material unless wearing appropriate personal protective equipment.

Change and wash clothing, and personal protective equipment if contaminated, or before storing and/or re-using. Wash hands and face thoroughly after handling and before work breaks, eating, drinking, smoking and using toilet facilities.

Conditions for safe storage, including any incompatibilities

Ensure sodium cyanide solid in bulk is stored and handled in accordance with Australian Standard AS 4452 *The storage and handling of toxic substances*. Ensure adequate ventilation to keep airborne concentration below exposure standard. Where necessary, use local exhaust ventilation in conjunction with P2 canister respirator, or as appropriate, self contained breathing apparatus.

Keep workplaces and stores well ventilated. Toxic concentrations of hydrogen cyanide gas can be reached when cyanide is in prolonged contact with air in a closed area. When opening a container storing cyanide, remove the lid, and move away to let the accumulated gas out of the container before returning to obtain the quantity required.

Store away from acids and water –sodium cyanide will release toxic and flammable hydrogen cyanide gas in contact with these substances. Store away from chlorinating agents. Contact with these may form toxic cyanogen chloride gas. Incompatible with oxidizing agents, copper, zinc, magnesium, tin, or their alloys (i.e., bronze, brass, galvanised metals, etc.) and aluminium.

Sodium cyanide solid will absorb moisture to evolve hydrogen cyanide gas.

Section 8 – Exposure Controls/Personal Protection

National exposure standards

ES-TWA	ES-STEL	ES-Peak
5 mg/m^3 as Cyanide (CN^-) dust	No data assigned by NOHSC	No data assigned by NOHSC
10 ppm as Hydrogen Cyanide (HCN)	Peak Limitation	Peak Limitation

Biological limit values

No data available.

Engineering controls

Handle sodium cyanide solid within closed systems whenever possible. Provide adequate ventilation at all times.

Personal protective equipment

Whenever the risk of exposure exists, such as opening sodium cyanide containers, non-routine operations and emergency circumstances, the following personal protection measure are recommended:

Respiratory protection

Canister respirator P2 type if air sampling indicates hydrogen cyanide level is between 11 and 50 mg/m^3 (Australian Standard *AS 1716 Respiratory protective devices*). Air supplied, or positive pressure, self contained breathing apparatus recommended where air sampling indicates hydrogen cyanide gas concentration exceeds 50 mg/m^3.

Personal protective equipment (cont..)

Hand protection

PVC or butyl rubber gauntlet-type gloves.

Eye protection

Chemical splash goggles (gas tight type preferred) and full face shield.

Skin protection

PVC overalls or jacket and pants and butyl rubber Wellington boots.

Section 9 – Physical and Chemical Properties

Appearance (colour, physical form, shape)
White solid briquette.

Odour
Slight bitter almond odour

pH
10% solution, approximately 9.

Vapour pressure
Virtually nil at dry, ambient conditions; 100 Pa at 800 °C.

Vapour density
No data available

Boiling point/range
1,500 °C at 101·3 kPa.

Freezing/melting point
Melts between 560 and 635 °C at 101·3 kPa.

Solubility
Solubility in water approximately 48 g/100 mL at 20 °C; sparingly soluble in ethanol.

Specific gravity or density
Specific Gravity: 1·5 to 1·6 at 20 °C; Bulk Density: 0·75 to 0·90 tonne/m^3 at 20 °C

Flash point and method of detecting flash point
Not applicable

Upper and lower flammable (explosive) limits in air
Not applicable

Ignition temperature
Not applicable

Viscosity
For a 30 % ($^{wt}/_{wt}$) aqueous solution: 10·3 mPa.s at 21·5 °C.

Section 10 – Stability and Reactivity

Chemical stability
Stable at ambient conditions of use and storage.

Conditions to avoid
Hydrogen cyanide forms if heated above 300 °C. Contact with water, acids, acid salts and carbon dioxide lead to the liberation of hydrogen cyanide gas.

Incompatible materials
Incompatible with oxidizing agents, copper, zinc, magnesium, tin, or their alloys (i.e., bronze, brass, galvanised metals, etc.) and aluminium.

Hazardous decomposition products
Toxic and flammable hydrogen cyanide gas.

Hazardous reactions
Store away from acids, acid salts, water and carbon dioxide fire extinguishers – sodium cyanide will release toxic and flammable hydrogen cyanide gas in contact with these substances. Store away from chlorinating agents – contacts with these may form toxic cyanogen chloride gas.

Section 11 – Toxicological Information

HEALTH EFFECTS

When handled in accordance with the guidelines in this material safety data sheet, sodium cyanide solid should not present any health effects. If this product is mishandled, the following symptoms may develop:

Acute:

Sodium cyanide solid is a very toxic chemical asphyxiant – may cause death soon after exposure by all means of entry into the human body. It may cause caustic burns in contact with human flesh. Cyanide inhibits cytochrome oxidase preventing oxygen utilization leading to cytotoxic anoxia. Acute effects depend on the degree of cellular hypoxia. Death results from central nervous system failure. Inhalation which cause weakness, headache, dizziness, shortness of breath, chest pain, confusion, cyanosis (bluish skin due to deficient oxygenation of the blood), weak and irregular heartbeat, collapse, unconsciousness, coma and death. Death can be very rapid. Ingestion will cause caustic burns, resulting in severe gastrointestinal tract irritation with nausea and vomiting, accompanied by severe burning sensation. Toxic amounts ingested may lead to poisoning symptoms similar for those for inhalation.

Inhalation:

Inhalation of sodium cyanide dust, or hydrogen cyanide vapour above the solid, may result in burns and irritation to the nose and upper respiratory tract, leading to coughing and sore throat. Lesions of the nasal septum and delayed pulmonary oedema may result. Toxic amounts may be inhaled leading to poisoning symptoms which include weakness, headache, dizziness, shortness of breath, chest pain, confusion, cyanosis (bluish skin due to deficient oxygenation of the blood), weak and irregular heartbeat, collapse, unconsciousness, coma and death. Death can be very rapid. The lethal oral dose of hydrogen cyanide is estimated to be approximately 50 mg in an adult (Sullivan, J.B. Jr., G.R. Krieger (eds.), *Hazardous Materials Toxicology-Clinical Principles of Environmental Health*, Baltimore, Williams and Wilkins, 1992).

Human physiological response to various concentrations of hydrogen cyanide in air are summarised in the table below:

HCN Level in		Duration in minutes	Resulting Conditions on Humans
mg/m^3	ppm		
2·2 - 5·5	2 - 5	-	Threshold of "bitter almonds" smell detectable by some people.
11	10	-	NOHSC peak limitation exposure standard.
19·8 - 39·6	18 -36	Several hours	Slight symptoms of cyanide poisoning.
48·5 -59·4	45 - 54	30 - 60 minutes	Tolerated without immediate or delayed effects.
121 - 148·5	110 - 135	30 - 60 minutes	Fatal, or dangerous to life.
148·5	135	30 minutes	Fatal.
199·1	181	10 minutes	Fatal.
297	270	Immediately	Immediately fatal.

(Simenova, F., Fishbein, L., Concise International Chemical Assessment Document 61, *Hydrogen Cyanide and Cyanides: Human Health Aspects*, International Program in Chemical Safety, Geneva, World Heath Organisation, 2004).

Skin:

Sodium cyanide solid will cause severe irritation and chemical burns. Sweat increases rate of absorption into skin. Toxic amounts may be absorbed through the skin, leading to poisoning symptoms similar to those for inhalation. LD_{50} (Dermal, rat) = 33 mg/kg.

Eye:

Sodium cyanide solid will cause severe irritation to the eye, leading to redness, pain and possible eye burns. May cause chemical conjunctivitis and corneal damage leading to loss of sight. Toxic amounts may be absorbed through the eye, leading to poisoning symptoms similar to those for inhalation.

Swallowed:

Sodium cyanide solid is very toxic and may be fatal if swallowed. It will cause caustic burns, resulting in severe gastrointestinal tract irritation with nausea and vomiting, accompanied by severe burning sensation. Toxic amounts ingested may lead to poisoning symptoms similar for those for inhalation. The mean lethal dose by mouth of cyanide in an 80 kg male human adult is thought to be in the range of 50 to 200 mg and death is rarely delayed more than one hour (Gosselin *et al*, *Clinical Toxicology of Commercial Products*. 5th Ed., Baltimore: Williams and Wilkins, 1984). LD_{50} (Oral, rat) = 6·44 mg/kg.

Chronic:

Cyanide may be highly acutely toxic, but it has lower toxicity on a chronic basis. Prolonged or repeated exposure may cause drying of the skin, dermatitis, ulceration, skin necrosis, loss of appetite, weight loss, dizziness, shortness of breath, muscle cramps and irritation to upper respiratory tract. Chronic cyanide intoxication has been associated with extremely rare neurological disorders, renal disease and isolated small observational studies of reporting effects on thyroid function. (Barnerjee et al, Evaluation of cyanide exposure and its effect on thyroid function on workers in a cable industry, J Occup Environ Med., 39(3):258-260, Barnerjee et al, Evaluation of cyanide exposure and its effect on thyroid function on workers in a cable industry, J Occup Environ Med., 39(3):258-260, 1997). As acutely toxic as cyanide is, repeated low-level doses of cyanide do not necessarily result in cumulative adverse effects.

Section 12 – Ecological Information

Ecotoxicity

Fish and aquatic invertebrates are very sensitive to cyanide exposure. Small concentrations, in the range of 5 to 20 mg cyanide per litre, causes a reduction in swimming performance, inhibiting reproduction and altering growth patterns. Increased cyanide concentrations in the range of 30 to 200 mg/L causes the deaths of many species of fish and invertebrates. Algae and macrophytes can tolerate much higher environmental concentrations of free cyanide than fish and invertebrates, but cyanide exposures may leave an aquatic plant community dominated by less sensitive species. Birds and higher mammals are susceptible to cyanide poisoning and display many symptoms associated with humans exposed to cyanide. The rapid recovery of some birds to sub-lethal doses of cyanide may be due to the rapid metabolism of cyanide to thiocyanate and its subsequent excretion. Cyanide has low persistence and is not accumulated or stored in any mammal studied.

Persistence and degradability

Potentially biodegradable by abiotic degradation. In aerobic conditions, microbial activity degrades cyanide ion (CN^-), in concentration up to 200 parts per million, to ammonia which then oxidises to nitrate (NO_3). Biological degradation may also occur under anaerobic conditions, but CN^- concentrations of more than 2 ppm are toxic to anaerobic micro organisms. Hydrogen cyanide may be hydrolysed to formic acid or ammonium formate- this reaction is not fast but may be appreciable faster in anaerobic conditions such as ground water.

- Water/Soil – in soils cyanide ion (CN^-) migrates easily to ground water and at high concentrations is toxic to soil micro organisms;
- Groundwater – persists in groundwater due to lack of sunlight/oxygen needed to degrade it to benign forms.

Mobility

- Air – HCN and small amounts of sodium cyanide present as dust particles – duration 1-3 years before settling out;

In alkaline conditions, due to approximately 2·5 % ($^{wt}/_{wt}$) total alkalinity content of sodium cyanide briquette:

- Water – considerable solubility and mobility – at surface water interface cyanide ion (CN^-) oxidises in the presence of sunlight and oxygen to yield cyanate ion (CNO^-), thiocyanate ion (SCN^-), ammonia, nitrate (NO_3) and various other compounds;
- Soil/Sediments – adsorption on minerals soil constituents possible - most persistent in groundwater and at higher pH.

Environmental fate (exposure)

Acute ecotoxicity:

Fish: 96 hr LD_{50} (Oncorhyncus mykiss): 0·028 mg/L, (as cyanide); in fresh water conditions at 6 °C;

Fish: 96 hr LD_{50} (Perca flavescens): 0·076 - 0·108 mg/L, (as cyanide); in fresh water conditions;

Fish: 96 hr LD_{50} (Pimephales promolas): 0·082 - 0·113 mg/L, (as cyanide); in fresh water conditions;

Crustaceans: 96 hr LD_{50} (Daphnia magna): 0·16 mg/L, (as cyanide), in fresh water conditions;

Soil organisms: 96 hr EC_{50} (Lumbriculus variegatus): 11 mg/L, (as cyanide);

Terrestrial plants: 32 days EC_{50} (Pimephales promolas): 22·4 mg/L, (as cyanide);

Birds: 96 days EC_{50} (Lymnaea luteola): 2·5 mg/L, (as cyanide).

Bioaccumulative potential

Low potential for human bioaccumulation. Does not bioaccumulate in fish.

Section 13 – Disposal Considerations

Disposal methods and containers

Due to its inherent properties, hazardous conditions may result if material is managed improperly. Dispose of all contained and contaminated spill residue in accordance with the requirements of the Department of the Environment. Contact CSBP Limited for technical advice on disposal method.

Special precautions for landfill or incineration

No data available

Section 14 – Transport Information

UN Number

1689

UN Proper shipping name

Sodium Cyanide

Class and subsidiary risk

Class 6.1 Toxic. No subsidiary risk.

Packing group

I

Special precautions for user

Transport in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code) and IMO. Transport only in approved packaging– typically, a sparge container, or composite intermediate bulk container (CIBC), comprising a woven polypropylene bulka-bag, a heat-sealed polyethylene box liner, and a plywood pallet-box. CIBC's may be stored on there own, but may only be transported in an approved sea container.

Hazchem code

2X

Section 15 – Regulatory Information

Australian regulatory information

SUSDP Poison Schedule 7. Licensing is required for this chemical in all States and Territories.

Listed on the Australian Inventory of Chemical Substances (AICS).

Additional national and/or international regulatory information

OSHA: Hazardous by definition of Hazard Communication Standard (29CFR 1910.1200).

This product is subject to the EC directive 82/501/EEC and amendments.

Classifications

Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on Approved Criteria for Classifying Hazardous substances [NOHSC: 1008(2004)].

Hazard Codes	N	Dangerous for the environment.
	T+	Very toxic.
	Xi	Irritant.
Risk Phrases	R26/27/28	Very toxic by inhalation, in contact with skin and if swallowed.
	R32	Contact with acids liberates very toxic gas.
	R38	Irritating to skin
	R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrases	S1/2	Keep locked up and out of reach of children.
	S4	Keep away from living quarters.
	S7/9	Keep container tightly closed and in a well ventilated place.
	S13	Keep away from food, drink and animal feeding stuffs
	S14	Keep away from incompatible materials as listed in the reactivity section.
	S18	Handle and open container with care.
	S20/21	When using, do not eat, drink or smoke.
	S22	Do not breathe dust.
	S24/25	Avoid contact with skin and eyes.
	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
	S27	Take off immediately all contaminated clothing
	S28	After contact with skin, wash immediately with plenty of water.
	S29	Do not empty into drains.
	S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
	S38	In case of insufficient ventilation, wear suitable respiratory equipment.
	S40	To clean the floor and all objects contaminated by this material use [appropriate material to be specified by the manufacturer].
	S41	In case of fire and/or explosion, do not breathe fumes.
	S43	In case of fire use only the recommended extinguishing agents.
	S45	In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).
	S46	If swallowed, contact a doctor or Poisons Information Centre immediately and show container or label.
	S50	Do not mix with incompatible materials.
	S51	Use only in well ventilated areas.
	S53	Avoid exposure - obtain special instructions before use.
	S56	Dispose of this material and its container at hazardous or special waste collection point.
	S57	Use appropriate container to avoid environmental contamination.
	S59	Refer to manufacturer / supplier for information on recovery / recycling.
	S61	Avoid release to the environment. Refer to special instructions/safety data sheets.
	S63	In case of accident by inhalation, remove casualty to fresh air and keep at

	rest.
S64	If swallowed, rinse mouth with water (only if the person is conscious).

Inventory listing(s)

AUSTRALIA: AICS (Australia Inventory of Chemical Substances)

All components are listed on the AICS; or are exempt.

Section 16 – Other Information

Key / legend to abbreviations and acronyms used in the MSDS

NOEC	No Observable Effect Concentration - concentration where no effect can be seen
NOHSC	National Occupational Health and Safety Commission
SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons
EC_{50}:	Environmental concentration 50. The concentration of a material, in ppm or ppb, in the environment (usually water) a single dose of which is expected to cause a biological effect on 50% of a group of test animals.
ES-TWA	Exposure Standard – Time weighted average
ES-STEL	Exposure Standard – Short term exposure level
ES-Peak	Exposure Standard – Peak level
FORS	Federal Office of Road and Safety
LC_{50}:	Lethal concentration 50, median lethal concentration
LD_{50}	Lethal dose 50. The single dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route other than inhalation
$\%(^{wt}/_{wt})$	Percent amount on a weight per weight basis
$\%(^{wt}/_{vol})$	Percent amount on a weight per volume basis
PPM	Parts per million
Zone 1 Class 1	An area where an explosive gas atmosphere can be expected to occur periodically or occasionally during normal operation. (More than 10 hours per year but less than 1000 hours per year)

Literature references

Occupational Safety and Health Regulations 1996, State Law Publisher, Western Australia.

Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals, Safe Work Australia, December 2011.

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(Editor), Geneva, 1998

Kirk-Othmer Encyclopaedia of Chemical Technology, 4th Edition, Wiley InterScience, New York, 1997.

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Literature references (cont..)

Poisons Act 1964, State Law Publisher, Western Australia, Reprinted 22 January 1999.

Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environmant, [NHSC:1003(1991)].

Hazardous Materials Handbook for Emergency Responders, Onguard Training for Life, J. Varela (Editor), Van Nostrand Reinhold, New York, 1996.

Chemalert www.chemalert.net

Guidance for the Compilation of Safety Data Sheets for Fertilizer Materials, European Fertilizer Manufacturers Association, online at www.efma.org/Publications/Guidance/Index.asp

Sources for data

No data available

Important Notes

1. To the best of our knowledge this document complies with the Code of Practice for the Preparation of Safety Data Sheets for Hazardous Chemicals, Safe Work Australia, December 2011.
2. This safety data sheet summarises our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this safety data sheet and consider the information in the context of how the product will be handled and used in the workplace, including in conjunction with other products.
3. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact the Safety Department, CSBP Limited on (08) 9411 8777 (Australia), +61 8 9411 8777 (Overseas).
4. Our responsibility for products sold, is subject to our terms and conditions, a copy of which is sent to our customers, and is also available on request.
5. CSBP reserves the right to make change to l safety data sheets without notice.

SAFETY DATA SHEET

according to the Global Harmonized System (and with all of the information required by the CPR)

Revision Date 07/31/2017 Version 1.7

SECTION 1.Identification

Product identifier

Product number	106498
Product name	Sodium hydroxide pellets for analysis EMSURE® ISO
CAS-No.	1310-73-2

Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis, Chemical production

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Corrosive to Metals, Category 1, H290
Skin corrosion, Category 1A, H314
Serious eye damage, Category 1, H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms



Signal Word
Danger

Hazard Statements
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary Statements

P234 Keep only in original container.
P260 Do not breathe dusts or mists.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P321 Specific treatment (see supplemental first aid instructions on this label).
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P405 Store locked up.
P406 Store in corrosive resistant stainless steel container with a resistant inner liner.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Formula	NaOH	HNaO (Hill)
Molar mass	40.00 g/mol	

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
sodium hydroxide (>= 90 % - <= 100 %)
1310-73-2

Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

General advice
First aider needs to protect himself.

Inhalation
After inhalation: fresh air. Call in physician.

Skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

Eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

Ingestion
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Risk of blindness!
Irritation and corrosion, Cough, Shortness of breath, collapse, death

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Not combustible.
Ambient fire may liberate hazardous vapors.

Advice for firefighters

Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. 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
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

No aluminum, tin, or zinc containers.

No metal containers.

Tightly closed. Dry.

Store at +5°C to +30°C (+41°F to +86°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
sodium hydroxide 1310-73-2			
CAD AB OEL	Ceiling Limit Value:	2 mg/m³	
CAD BC OEL	Ceiling Limit Value:	2 mg/m³	
CAD MB OEL	Ceiling Limit Value:	2 mg/m³	
CAD ON OEL	Ceiling Limit Value (CEV):	2 mg/m³	
OEL (QUE)	Ceiling Limit Value:	2 mg/m³	Recirculation prohibited

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	> 480 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:
protective clothing

Respiratory protection
required when dusts are generated.
Recommended Filter type: Filter P 2 (acc. to DIN 3181) for solid and liquid particles of harmful substances
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer. These measures have to be properly documented.

SECTION 9. Physical and chemical properties

Physical state	solid
Color	white
Odor	odorless
Odor Threshold	Not applicable
pH	ca. > 14 at 100 g/l 68 °F (20 °C)
Melting point/range	606 - 612 °F (319 - 322 °C)
Boiling point/boiling range	2,534 °F (1,390 °C) at 1,013 hPa
Flash point	Not applicable
Evaporation rate	No information available.
Flammability (solid, gas)	The product is not flammable.

Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapor pressure	at 68 °F (20 °C) Not applicable
Relative vapor density	No information available.
Density	2.13 g/cm3 at 68 °F (20 °C)
Relative density	No information available.
Water solubility	1,090 g/l at 68 °F (20 °C)
Partition coefficient: n-octanol/water	No information available.
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Ignition temperature	Not applicable
Corrosion	May be corrosive to metals.

SECTION 10. Stability and reactivity

Reactivity
See below

Chemical stability
hygroscopic

Possibility of hazardous reactions
Violent reactions possible with:

Acetone, Chlorine, Ethylene oxide, Fluorine, Hydrogen halides, Hydrazine hydrate, hydroxylamine, Acid anhydrides, Acrolein, Acid chlorides, Acids, sulfuric acid, Chloroform, Water, hydrogen peroxide, anhydrides, EPICHLOROHYDRIN, phosphides, halogen-halogen compounds, trichloroethene, ALLYL ALCOHOL

can decompose violently in contact with:

Organic Substances, hydrogen sulfide

Risk of ignition or formation of inflammable gases or vapors with:

powdered aluminum, Ammonium salts, persulfates, Sodium borohydride, phosphorus, Oxides of phosphorus, Halogenated hydrocarbon, Light metals, Metals

Risk of explosion/exothermic reaction with:

Bromine, Calcium, in powder form, furfuryl alcohol, Nitromethane, Peroxides, organic nitro compounds, Nitriles, Acrylic monomers, SILVER NITRATE

Chloroform, with, Acetone

Nitrobenzene, with, Methanol

Nitrobenzene, with, salts

magnesium, Zinc, and, Tin, (in the presence of atmospheric oxygen and/or moisture)

Conditions to avoid
Moisture.

Incompatible materials
Aluminum, brass, Metals, metal alloys, Zinc, Tin

Hazardous decomposition products
in the event of fire: See section 5.

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Eye contact, Skin contact, Ingestion

Acute oral toxicity

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute inhalation toxicity

Symptoms: burns of mucous membranes, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Corrosive to respiratory system.

Corrosive to respiratory system.

Skin irritation
Rabbit
Result: Causes burns.
(External MSDS)

Causes severe burns.

Eye irritation
Rabbit
Result: Irreversible effects on the eye
(ECHA)

Causes serious eye damage.
Risk of blindness!

Sensitization
Patch test: human
Result: negative

(ECHA)

Genotoxicity in vitro
Mutagenicity (mammal cell test): micronucleus.
Result: negative
(Lit.)

Ames test
Result: negative
(IUCLID)

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information
Systemic effects:
collapse, death
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
LC50 Gambusia affinis (Mosquito fish): 125 mg/l; 96 h (External MSDS)

Toxicity to daphnia and other aquatic invertebrates
EC50 Ceriodaphnia (water flea): 40.4 mg/l; 48 h (ECHA)

Toxicity to bacteria
EC50 Photobacterium phosphoreum: 22 mg/l; 15 min (External MSDS)

Persistence and degradability
Biodegradability

The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative potential
No information available.

Mobility in soil
No information available.

Additional ecological information
Harmful effect due to pH shift.
Forms corrosive mixtures with water even if diluted.
Neutralization possible in waste water treatment plants.
Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 1823
Proper shipping name	SODIUM HYDROXIDE, SOLID
Class	8
Packing group	II
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 1823
Proper shipping name	SODIUM HYDROXIDE, SOLID
Class	8
Packing group	II
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 1823
Proper shipping name	SODIUM HYDROXIDE, SOLID
Class	8
Packing group	II
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-A S-B

SECTION 15. Regulatory information

United States of America

Canada

WHMIS Classification

E Corrosive Material

May be corrosive to metals., Corrosive to skin, Corrosive to eyes, Corrosive by inhalation.
This product has been classified according to the hazard criteria of the HPR and the SDS contains all of the information required by the HPR.

Notification status

TSCA: All components of the product are listed in the TSCA-inventory.

DSL: All components of this product are on the Canadian DSL

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

Labeling

Hazard pictograms



Signal Word
Danger

Hazard Statements
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary Statements
Prevention
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

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 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Revision Date07/31/2017

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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GENERAL CARBON CORP.

SAFETY DATA SHEET

Section 1 - Identity

Identity (As Used on Label and List): GC Activated Carbon (Including, but not limited to GC C-40, GC 4 x 8B, GC 4 x 8S, GC 6 x 12, GC 6 x 12S, GC 8 x 30, GC 8 x 30AW, GC 8 x 30S, GC 8 x 30SAW, GC 12 x 40, GC 12 x 40AW, GC 12x40SAW, GC 20 x 50, GC 20 x 50S, GC Powdered, GC WDC activated carbons)

Manufacturers Name: General Carbon Corporation
33 Paterson Street
Paterson, NJ 07501
Tel: (973)523-2223
www.generalcarbon.com
Date Prepared: February 16, 2017

Section 2 - Hazardous Identification

2.1 GHS-US Classification

Eye Irritation	2B H320
STOT	SE 3 H335

Hazards not otherwise classified: Combustible dust. May form combustible dust concentrations in air. All powdered activated carbons are classified as weakly explosive (Dust explosion class St1): Given the necessary conditions of a strong ignition source, right concentrations of airborne carbon dust, adequate oxygen levels, and confinement, the potential for a deflagration event exists. A combustible dust hazard assessment and employee training should be carried out. See sections 7 and 9 for further information on combustible dust precautions.

2.2 Label Elements



Hazard Pictograms

Signal word (GHS-US) : Warning
Hazard Statements : H320- Causes eye irritation
: H335- May cause respiratory irritation
Precautionary statements (GHS-US) : P261- Avoid breathing dust
: P264- Wash thoroughly after handling
: P271- Use in well-ventilated area
: P280- Wear protective gloves/clothing/eye & face protect
: P304&340: IF INHALED: Remove person to fresh air

: P305&351&P338: If in eyes, Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
: P312- Call Poison Control Center/Doctor if you feel sick
: P403& P233- Store in well-ventilated place. Keep container tightly closed
: P405- Store locked up
: P501- Dispose of container to appropriate receptacle

2.3 Other Hazards

No additional information available

2.4 Unknown acute toxicity (GHS-US)

No data available

Section 3: Composition/information on ingredients

3.1 Substances

Not applicable

3.2 Mixture

Name	CAS #	%	GHS_US classification
Carbon	7440-44-0	100	Not classified

Section 4 – First Aid Measures

4.1 Description of first aid measures

First aid after inhalation	Remove person to fresh air. If not breathing, administer CPR or artificial respiration. Get immediate medical attention.
First aid after skin contact	If skin reddening or irritation develops, seek medical attention
First aid after eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. If irritation persists, get medical attention.
First aid after ingestion	If the material is swallowed, get immediate medical attention or advice. DO NOT induce vomiting unless directed to do so by medical personnel.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	May cause respiratory irritation
Symptoms/injuries after skin contact	May cause skin irritation
Symptoms/injuries after eye contact	Causes serious eye damage
Symptoms/injuries after ingestion	May be harmful is swallowed

4.3 Indication of any immediate medical attention and special treatment needed

No additional information available.

Section 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	If involved with fire, flood with plenty of water
Unsuitable extinguishing media	None

5.2 Special hazards arising from substance or mixture

Fire hazard	None known
Explosion hazard	None known
Reactivity	Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire.

5.3 Advice for firefighters

Protection during firefighting	Firefighters should wear full protective gear

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

General measures	Avoid contact with the skin and eyes

6.1.1 For non-emergency personnel

No additional information available

6.1.2 For emergency responders

No additional information available

6.2 Environmental precautions

None

6.3 Methods and material for containment and cleaning up

For containment	If possible, stop flow of product
Methods for cleaning up	Shovel or sweep up and put in closed container for disposal

6.4 Reference to other sections

No additional information available

Section 7: Handling and storage

7.1 Precautions for safe handling

Precautions for safe handling	Avoid contact with eyes. Wet activated carbon removes oxygen from air causing severe hazard to workers inside carbon vessels or confined spaces

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions	Protect containers from physical damage. Store in dry, cool, well-ventilated area. Store away from strong oxidizers, strong acids, ignition sources, combustible materials, and heat. An adequate air gap between packages is recommended to reduce propagation in the case of fire **.**

Handling: A hazard assessment should be carried out. As with all finely divided materials, ground all transfer, blending, and dust collecting equipment to prevent static discharge. Remove all strong ignition sources from material handling, transfer, and processing areas where dust may be present or accumulate. Practice good housekeeping. Excessive accumulations of dust or dusty conditions can create the potential of secondary explosions. Inspection of hidden surfaces for dust accumulation should be made routinely. If possible, eliminate the pathways for dust to accumulate in hidden areas. Fine carbon dust may penetrate electrical equipment and cause electrical shorts. Where dusting is unavoidable, dust-proof boxes and regular electrical line maintenance are recommended. Refer to NFPA standards 654 for guidance.

Caution employees-no smoking in carbon storage and handling areas. Carbon is difficult to ignite, however, cutting and welding operations should be carried out using hot work permit systems where precautions are taken not to ignite carbon, which may smolder undetected.

7.3 Specific end use(s)

No additional information available

Section 8: Exposure controls/ personal protection

8.1 Control parameters

No additional information available

8.2 Exposure controls

Appropriate engineering controls	: Local exhaust and general ventilation must be adequate to meet exposure standards
Hand Protection	: None required under normal product handling conditions
Eye Protection	: safety glasses
Skin and body protection	: Wear suitable working clothes
Respiratory protection	: If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Particulate
Color	: Black
Odor	: No data available
Odor threshold	: No data available
Ph	: No data available
Relative evaporation rate	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Self ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor density @ 20 deg C	: No data available
Relative Density	: 28-33 lb/ cubic foot
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosive limits	: No data available

Combustible dust- These products may contain combustible dusts. May form combustible dust concentrations in air. All powdered activated carbons are weakly explosive. No specific information on these carbons are available.
Typical combustible dust data for a variety of activated carbons:
K_{st} values reported between 43-113 (various sources).
Dust explosion class St1 (K_{st} values < 200 are Class St1-weakly explosive).
MEC (minimum explosible concentration) in air 50 and 60 g/m^3 (two reports)
Volatile content (by weight): < 8% ASTM D3175-11 (Watercarb)
MIT (minimum ignition temperature) values reported between 400-680°C (752-1256°F) (four reports)
Maximum Absolute Explosion pressure values reported between 6.0-8.6 bar (four reports)

9.2 Other information
No additional information available

Section 10: Stability and reactivity

10.1 Reactivity
Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, etc. may result in fire

10.2 Chemical stability
Stable under normal conditions

10.3 Possibility of hazardous reactions
Will not occur

10.4 Conditions to avoid
None

10.5 Incompatible materials
Strong oxidizing and reducing agents such as ozone, liquid oxygen or chlorine.

10.6 Hazardous decomposition products
Carbon monoxide may be generated in the event of a fire.

Section 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity : Not classified

Carbon (7440-44-0)

LD50 oral rat	: >10000 mg/kg
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Causes eye irritation
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity	: May cause respiratory irritation (single exposure)
Specific target organ toxicity	: Not classified (repeated exposure)
Aspiration hazard	: Not classified

Section 12: Ecological Information

12.1 Toxicity
No additional information available

12.2 Persistence and degradability
No additional information available

12.3 Bioaccumulative potential
No additional information available

12.4 Mobility in soil
No additional information available

12.5 Other adverse effects

No additional information available

Section 13: Disposal concerns

13.1 Waste treatment methods

Waste Disposal recommendations : Dispose of contents/container in accordance with local/ regional/ international regulations

Section 14: Transportation information

In accordance with DOT/ADR/RID/ADNR/IMDG/ICAO/IATA

14.1 UN Number

Not applicable. See Note 1 below.

14.2 UN proper shipping name

Not applicable

Note 1: Under the UN classification for activated carbon, all activated carbons have been identified as a class 4.2 product. However, This product has been tested according to the United Nations Transport of Dangerous Goods test protocol for a "self-heating substance" (United Nations Transportation of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 33.3.1.6 - Test N.4 - Test Method for Self Heating Substances) and it has been specifically determined that this product does not meet the definition of a self heating substance (class 4.2) or any other hazard class, and therefore should not be listed as a hazardous material. This information is applicable only for the Activated Carbon Product identified in this document.

Section 15: Regulatory information

15.1 US Federal regulations

Carbon (7440-44-0)

Listed on the United States TSCA inventory

15.3 US State regulations

No additional information available

Section 16: Other information

Full text of H-phrases:

Eye Irrit. 2B	Serious eye damage/eye irritation Category 2B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H335	May cause respiratory irritation

NFPA®



NFPA health hazard	: 1-Exposure could cause irritation but only minor residual injury even if no treatment is given
NFPA fire hazard	: 1- Materials that require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur (e.g. mineral oil). Includes some finely divided suspended solids that do not require heating before ignition can occur. Flash point at or above 93.3 °C (200 °F)
NFPA reactivity	: 0- Normally stable, even under fire exposure conditions, and are not reactive with water

The information contained herein is accurate to the best of our knowledge. General Carbon Corporation makes no warranty with respect hereto said information and disclaims all liability from reliance there in.

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SDS

Material Safety Data Sheet
August 25, 2015

Section 01: Chemical Product Identification

Domestic Trade Name: **PT401 Antiscalant** **Synonyms:** NA
Export Trade Name: PT401 Antiscalant **CAS Number:** NA
Product Use: Reverse Osmosis Membrane Pretreatment/Antiscalant
Manufacturer/Supplier: AmeriWater **Address:** 1303 Stanley Ave, Dayton Ohio, 45404, USA
General Information: 937-461-8833
Transportation Emergency Number: **CHEMTREC: 800-424-9300 (Domestic North America)**
703-527-3887 (International, collect calls accepted)

Section 02: Hazards Identification:

GHS Classification:

Health	Environmental	Physical
Health Hazards: Primary Route of Exposure: Skin contact, eye contact, and inhalation Inhalation: Exposure to spray may cause irritation to the mucous membranes and respiratory system Skin Contact: Exposure to skin can cause irritation Eye contact: Material can cause irritation to eyes Ingestion: Material is not harmful if accidentally ingested ***Medical Conditions Aggravated by Exposure:*** None known ***TLV***: Threshold Limit Value - N/A, no danger exists	*Acute Toxicity:* Mutagenicity: AMES Salmonella Mutagenicity Testing exhibits no evidence of mutagen presence. Oral Toxicity: Rat LD50>100,000 mg/kg Dermal Toxicity: Not absorbed topically Inhalation Toxicity: None known Skin Irritation: Rabbit; No irritation observed Sensitizer: No human repeat insult patch test; Not a sensitizer	Boiling Point: That of Water Vapor Pressure: That of Water Vapor Density: That of Water Water Solubility: Complete Melting/Freezing Point: 32°F Appearance: Clear to light amber Specific Gravity: 1.0 - 1.2 g/ml Percentage Volatile: 70% Evaporation Rate: That of Water pH of Solution: 2.5 – 5.5 Odor: Mild

GHS Label:

Symbols: None

Hazard Statements
Causes mild skin irritation and eye damage.
May cause allergic skin reaction.

Precautionary Statements
Do not eat or drink when using this product.
Do not breathe mist/vapors.
Keep container tightly closed.
Wear protective gloves & eye/face protection.
Use in a well-ventilated area.
Store container tightly closed in cool/well-ventilated place.
Wash thoroughly after handling.

Section 03: Composition / Information on Ingredients

Component	CAS Number
PT401 Antiscalant	Non-DOT regulated ingredients (FDA grade weak organic acids and polyelectrolytes.

(See Section 8 for Exposure Limits)

Section 04: First Aid Measures

Eye: Eye irritation. Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get immediate medical attention.
Skin: Itching or irritation of the skin. Immediately flush the skin with plenty of water while removing contaminated clothing and shoes. Wash contaminated clothing before reuse.
Inhalation: For nasal irritation, remove exposed person from source of exposure to fresh air. If not breathing, clear airway and start cardiopulmonary resuscitation (CPR). Get immediate medical attention.
Ingestion: Precautionary measures suggest inducing vomiting immediately by giving two (2) full glasses of water and sticking finger down throat. Never Give Anything by Mouth to an Unconscious Person. Call a physician.

Section 05: Fire Fighting Measures

Suitable Extinguishing Media: Use dry chemical, foam, or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire-exposed containers, structures and to protect personnel. Use water to dilute spills and to flush them away from sources of ignition.
Fire Fighting Procedures: Use media appropriate to primary cause of fire. Use water spray to cool containers exposed to fire. Minimize exposure. Do not breathe fumes. Contain run-off.
Unusual Fire and Explosion Hazards: None known
Combustion Products: May present an explosion hazard under dust loading conditions in excess of 25,000 mg/M3.

Section 06: Accidental Release Measures

***Land Spill*:** Wearing recommended protective clothing and equipment, scoop up. Place waste in approved containers for disposal. Dispose waste according to Federal, State, and local regulations.
Water Spill: Wear protective clothing and equipment. Stop flow. Dike contaminated water and remove for disposal and/or treatment. Notify proper authorities and all downstream users if possible. Dispose of with Solid Waste according to Federal, State, and Local Regulations.
Personal protection: Wear a NIOSH approved (or equivalent) respirator (with an organic/acid gas cartridge and a dust filter) during spill clean up and deactivation of the material. Protective clothing including chemical splash goggles, Latex, nitrile, or buytl rubber full-length gloves, rubber apron made of nitrile or buytl rubber, and rubber overshoes must be worn during spill clean-ups and deactivation of material. If this material comes into contact with the skin during clean-up operations, immediately remove all contaminated clothing and wash exposed skin areas with soap and water. See section 4, First Aid Measures, for further information.

Section 07: Handling and Storage

Handling: Do not get in eyes, on skin or on clothing. Do not breathe vapors or mists. Keep container closed. Use only with adequate ventilation. Use good personal hygiene practices. Wash hands before eating, drinking, smoking. Remove contaminated clothing and clean before re-use.
Storage: The maximum storage temperature for this material is 55°C/131°F. The minimum storage temperature for this material is 0°C/32°F. Store in a well ventilated area. Do not store this material in containers made of steel.

Empty containers may contain toxic, flammable and explosive residue or vapors. Do not cut, grind, drill, or weld on or near containers unless precautions are taken against these hazards.

Section 08: Exposure Control/Personal Protection

Exposure Limits
Engineering Controls: Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces.
Personal Protective Equipment (PPE)
Eye Protection: Safety glasses, splash goggles, and/or face shields (ANSI Z87.1 or approved equivalent). Have eye-wash stations available where eye contact can occur.
Skin Protection: Avoid skin contact. Wear gloves impervious to conditions of use. Additional protection may be necessary to prevent skin contact including use of apron, face shield, boots or full body protection. A safety shower should be located in the work area. Recommended protective materials include: Butyl rubber and for limited contact Teflon.

Respiratory Protection: If exposure limits are exceeded, NIOSH approved respiratory protection should be worn. A NIOSH approved respirator for organic vapors is generally acceptable for concentrations up to 10 times the PEL. For higher concentrations, unknown concentrations and for oxygen deficient atmospheres, use a NIOSH approved air-supplied respirator. Engineering controls are the preferred means for controlling chemical exposures. Respiratory protection may be needed for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA 29 CFR 1910.134**.**

Section 09: Physical and Chemical Properties

Boiling Point: Same as Water
Melting/Freezing Point: 0°C / 32°F.
Appearance: Clear to Light Amber Liquid.
Specific Gravity: 1.0 – 1.2 g/ml
Percentage Volatile: 70%
Evaporation Rate: Same as Water
pH of Solution: 2.5 – 5.5

Odor: Mild Odor
Vapor Pressure: Same as Water
Vapor Density: Same as Water
Water Solubility: Complete
Auto ignition Temp: N/A
Flammable Limits: LEL (Lower Explosive Limits) N/A

Section 10: Stability and Reactivity

Stability: Stable under normal storage conditions. See Section 7, Handling and Storage, for specific conditions.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: None Known.
Incompatible Materials: Strong Oxidizing or Reducing Agents.
Hazardous Decomposition Products: None Known.

Section 11: Toxicological Information

Signs and Symptoms of Overexposure: Eye and nasal irritation, headache, dizziness, nausea, vomiting, difficulty breathing, weakness, itching or burning of the skin.

Acute Effects:
Eye Contact: may cause conjunctival irritation.
Skin Contact: may cause reddening or allergic skin reaction.
Inhalation: may cause irritation.
Ingestion: may cause gastrointestinal burns.
Target Organ Effects: None known
Chronic Effects: None known
Medical Conditions Aggravated by Exposure: None known.

Acute Toxicity Values
Acute Toxicity:
Mutagenicity: AMES Salmonella Mutagenicity Testing exhibits no evidence of mutagen presence.
Oral Toxicity: Rat LD50>100,000 mg/kg
Dermal Toxicity: Not absorbed topically
Inhalation Toxicity: None known
Skin Irritation: Rabbit; No irritation observed
Sensitizer: No human repeat insult patch test; Not a sensitizer

Section 12: Ecological Information

Environmental Toxicity:

Acute Fish 96 Hr LC50, Flathead minnow: 750 mg/L, NOEC/LOEC 500/1000
Acute Daphnia 48 Hr EC50: 743 mg/L, NOEC/LOEC 500/1000
Acute Purple sea urchin 40min. IC25 mg/L: >10, NOEC/LOEC 10/>10

Section 13: Disposal Considerations

Incinerate liquid and contaminated solids in accordance with Federal, State, and Local regulations and permits. Refer to state and local requirements for any additional requirements, as these may be different from Federal laws and regulations. Chemical additions, processing or otherwise altering this material may make waste management information presented in the MSDS incomplete, inaccurate or otherwise inappropriate.

Section 14: Transport Information

U.S. Department of Transportation - USDOT
Proper Shipping Name: PT401 Antiscalant
Dot Hazard Class: Not regulated
UN/NA Number: None
Packing Group: None
Labels Required: None

International Maritime Organization (IMDG)
Proper Shipping Name: PT401 Antiscalant
Hazard Class: Not regulated
UN/NA Number: None
Packing Group: None
Labels Required: None

Section 15: Regulatory Information

U.S. Federal Regulations
Comprehensive Environmental Response and Liability Act of 1980 (CERCLA):
No reportable quantity (RQ) for this material. If appropriate, immediately report to the National Response Center (800/424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies.

Toxic Substances Control Act (TSCA): All components of this product are included on the TSCA inventory.
Clean Water Act (CWA): PT401 Antiscalant is not a hazardous substance under the Clean Water Act. Consult Federal, State and local regulations for specific requirements.
Clean Air Act (CAA): PT401 Antiscalant is not a hazardous substance under the Clean Air Act. Consult Federal, State and local regulations for specific requirements.
Superfund Amendments and Reauthorization Act (SARA) Title III Information:
SARA Section 313 Notification (40CFR 372)
This Product Does Not Contain Toxic Chemicals Subject to the Reporting Requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

State Regulations
California: This product does not contain any chemicals(s) known to the State of California to cause cancer, birth defects or reproductive harm.

International Regulations
Canadian Environmental Protection Act: All of the components of this product are included on the Canadian Domestic Substances list (DSL).
Canadian Workplace Hazardous Materials Information System (WHMIS): None
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

European Inventory of Existing Chemicals (EINECS): All of the components of this product are included on EINECS.
EU Classification:

EU Risk (R) and Safety (S) Phrases:
R37/38: Irritating to respiratory system and skin.
R41: Risk of serious damage to eyes.
R43: May cause sensitization by skin contact.
S53: Avoid exposure - obtain special instructions before use.
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S9: Keep container in a well-ventilated place.
S36/37: Wear suitable protective clothing and gloves.
S57: Use appropriate container to avoid environmental contamination.

Section 16: Other Information

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 0
Flammability: 0
Reactivity: 0

SAFETY DATA SHEET

SDS ID NO.: 0168MAR019
Revision Date 05/22/2015

1. IDENTIFICATION

Product Name: Marathon Petroleum Multi-purpose DM Automatic Transmission Fluid

Synonym: Marathon Multipurpose Automatic Transmission Fluid; Marathon DM Automatic Transmission Fluid; Marathon DM ATF; Marathon Multi-purpose ATF;
Product Code: 0168MAR019
Chemical Family: Hydrocarbon Mixture

Recommended Use: Automatic transmission fluid.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:

MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards Not Otherwise Classified (HNOC)
Not applicable.

Label elements

EMERGENCY OVERVIEW

No known significant effects or critical hazards.

Appearance Red Liquid **Physical State** Liquid **Odor** Petroleum

Precautionary Statements - Prevention
Not applicable.

Precautionary Statements - Response
Not applicable.

Precautionary Statements - Storage
Not applicable.

Precautionary Statements - Disposal
Not applicable.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Automatic Transmission Fluid (ATF) is a complex mixture of highly refined lubricating oil base stocks and additives.
Composition Information:

Name	CAS Number	% Concentration
Distillates (petroleum), hydrotreated heavy paraffinic	64742-54-7	< 100
Distillates (petroleum), hydrotreated light	64742-47-8	1-5

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If symptoms occur get medical attention.

Skin Contact: Wash skin with plenty of soap and water. If irritation or other symptoms occur get medical attention. Wash contaminated clothing and clean shoes before reuse. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Eye Contact: Immediately flush eyes with plenty of water. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Rinse mouth out with water. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. If symptoms develop, seek medical attention.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Preexisting skin conditions and respiratory disorders may be aggravated by exposure to components of this product.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical
The product is not combustible per the OSHA Hazard Communication Standard, but will ignite and burn at temperatures exceeding the flash point.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge No.

Special protective equipment and precautions for firefighters
Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Use water spray to cool exposed surfaces from as far a distance as possible. Keep run-off water out of sewers and water sources.

Additional firefighting tactics
Not applicable.

NFPA	Health 1	Flammability 1	Instability 0	Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Avoid release to the environment. Avoid subsoil penetration.
Methods and materials for containment:	Prevent further leakage or spillage if safe to do so.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers.

7. HANDLING AND STORAGE

Safe Handling Precautions:	Avoid contact with skin, eyes and clothing. Do not swallow. Avoid breathing vapors or mists. Use good personal hygiene practices. Wash thoroughly after handling. Use personal protection measures as recommended in Section 8. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions: Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Store away from incompatible materials.

Incompatible Materials Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELS:	OSHA - Vacated PELs	NIOSH IDLH
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	Oil Mist, Mineral 5 mg/m³ TWA (inhalable fraction)	-	-	-
Distillates (petroleum), hydrotreated light 64742-47-8	200 mg/m³ TWA (total hydrocarbon vapor) Skin - potential significant contribution to overall exposure by the cutaneous route	-	-	-

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required when using at elevated temperatures that generate vapors or mists.

Personal protective equipment

Eye protection: Use goggles or face-shield if the potential for splashing exists.

Skin and body protection: Wear neoprene, nitrile or PVA gloves to prevent skin contact. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times. Wear appropriate protective clothing.

Respiratory protection: Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Red Liquid
Color	Red
Odor	Petroleum
Odor Threshold	No data available.

Property	Values (Method)
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	No data available.
Flash Point	> 180 °C / > 356 °F (Cleveland Open-Cup)
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	No data available.
Lower Flammability Limit:	No data available.
Explosion limits:	No data available.
Vapor Pressure	No data available.
Vapor Density	No data available.
Specific Gravity / Relative Density	0.849-0.859
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	No data available.
Decomposition temperature	No data available.
pH:	No available data.
Autoignition Temperature	No data available.
Kinematic Viscosity	≥ 29 mm2/s @ 40°C / 104°F (ASTM D445)
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	No data available.
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

Reactivity The product is non-reactive under normal conditions.

Chemical stability Stable under recommended storage conditions.

Possibility of hazardous reactions None under normal processing.

Hazardous polymerization Will not occur.

Conditions to avoid Sources of heat or ignition.

Incompatible Materials Strong oxidizing agents.

Hazardous decomposition products None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation Overheating may produce vapors which may cause respiratory irritation, dizziness and nausea.

Eye contact Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.

Skin contact Prolonged or repeated exposure may cause dermatitis, folliculitis or oil acne.

Ingestion May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50

Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	> 5000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 5 mg/L (Rat) 4 h
Distillates (petroleum), hydrotreated light 64742-47-8	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

This product is considered to have a low order of acute and chronic oral and dermal toxicity.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects None known.

Carcinogenicity Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	Not Listed	Not Listed	Not Listed	Not Listed
Distillates (petroleum), hydrotreated light 64742-47-8	Not Listed	Not Listed	Not Listed	Not Listed

Reproductive toxicity None known.

Specific Target Organ Toxicity (STOT) - single exposure Not classified.

Specific Target Organ Toxicity (STOT) - repeated exposure Not classified.

Aspiration hazard Not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity No information available.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Distillates (petroleum), hydrotreated heavy paraffinic 64742-54-7	-	LL50 >100 mg/l Fish	-	-
Distillates (petroleum), hydrotreated light 64742-47-8	-	96-hr LC50 = 2.2 mg/l Bluegill	-	-

Persistence and degradability No information available.

Bioaccumulation No information available.

Mobility in soil No information available.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
No information available.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:	Not Regulated
UN/Identification No:	Not applicable
Class:	Not applicable.
Packing Group:	Not applicable.

TDG (Canada):

UN Proper Shipping Name:	Not Regulated
UN/Identification No:	Not applicable.
Transport Hazard Class(es):	Not applicable.
Packing Group:	Not applicable.

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product may contain component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Distillates (petroleum), hydrotreated heavy paraffinic	NA
Distillates (petroleum), hydrotreated light	NA

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Distillates (petroleum), hydrotreated heavy paraffinic	NA
Distillates (petroleum), hydrotreated light	NA

SARA Section 311/312: The following EPA hazard categories apply to this product:

None

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus

threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Distillates (petroleum), hydrotreated heavy paraffinic	None
Distillates (petroleum), hydrotreated light	None

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Distillates (petroleum), hydrotreated heavy paraffinic

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed
Pennsylvania Right-To-Know:	Not Listed
Massachusetts Right-To Know:	Not Listed
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Distillates (petroleum), hydrotreated light

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed
Pennsylvania Right-To-Know:	Not Listed
Massachusetts Right-To Know:	Not Listed
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.

Note: Uncontrolled product according to WHMIS classification criteria.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Notes

Revision Date 05/22/2015

Disclaimer

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 is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not 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.

SAFETY DATA SHEET

1. Identification

Product identifier	**Battery Terminal Protector**
Other means of identification	
Product Code	No. 75046 (Item# 1006303)
Recommended use	Battery terminal protector
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufactured or sold by:	
Company name	CRC Canada Co.
Address	2-1246 Lorimar Drive Mississauga, Ontario L5S 1R2 Canada
Telephone	
General Information	905-670-2291
24-Hour Emergency (CHEMTREC)	800-424-9300 (Canada) 703-527-3887 (International)
Website	www.crc-canada.ca
E-mail	Support.CA@crcindustries.com

2. Hazard(s) identification

Physical hazards	Flammable aerosols	Category 1
	Gases under pressure	Liquefied gas
	Physical hazards not otherwise classified	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Carcinogenicity	Category 2
	Reproductive toxicity (fertility)	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure (oral)	Category 2 (central nervous system, kidney, liver)
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1

Label elements



Signal word	Danger
Hazard statement	Extremely flammable aerosol. Contains gas under pressure; may explode if heated. Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause drowsiness or dizziness. Suspected of causing cancer. Suspected of damaging fertility. May cause damage to organs (central nervous system, kidney, liver) through prolonged or repeated exposure by ingestion. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not spray on an open flame or other ignition source. Do not pierce or burn, even after use. Do not breathe mist or vapor. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Avoid release to the environment.

Response IF SWALLOWED: Immediately call a POISON CENTER/doctor. Do NOT induce vomiting. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. 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. IF exposed or concerned: Get medical advice/attention. In case of fire: Do not use water jet as an extinguisher, as this will spread the fire. Collect spillage.

Storage Keep container tightly closed. Store locked up. Protect from sunlight. Store in a well-ventilated place. Do not expose to temperatures exceeding 50°C/122°F.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Other hazards None known.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
liquefied petroleum gas		68476-86-8	15 - 40
n-heptane		142-82-5	10 - 30
petrolatum		8009-03-8	7 - 13
2-methylpentane		107-83-5	5 - 10
3-methylhexane		589-34-4	5 - 10
naphtha (petroleum), hydrotreated light		64742-49-0	5 - 10
methylcyclohexane		108-87-2	3 - 7
2-methylhexane		591-76-4	1 - 5
heptane, branched, cyclic and linear		426260-76-6	1 - 5
paraffin oils (petroleum), catalytic dewaxed heavy		64742-70-7	1 - 5
solvent naphtha (petroleum), light aliph.		64742-89-8	1 - 5
xylene		1330-20-7	1 - 5
3-ethylpentane		617-78-7	0.5 - 1.5
ethylbenzene		100-41-4	0.5 - 1.5
n-hexane		110-54-3	0.5 - 1.5
2,2-dimethylbutane		75-83-2	0.1 - 1
2,3-dimethylbutane		79-29-8	0.1 - 1
3,3-dimethylpentane		562-49-2	0.1 - 1
3-methylpentane		96-14-0	0.1 - 1
paraffin oils (petroleum), catalytic dewaxed light		64742-71-8	0.1 - 1
toluene		108-88-3	0.1 - 1

The exact percentage (concentration) of composition has been withheld as a trade secret.
All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Narcosis. Headache. Nausea, vomiting. Behavioral changes. Decrease in motor functions. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Edema. Jaundice. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. 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	Water fog. Foam. Carbon dioxide (CO2). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Contents under pressure. Pressurized container may rupture when exposed to heat or flame. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. This liquid may accumulate static electricity when filling properly grounded containers. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire fighting equipment/instructions	In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Containers should be cooled with water to prevent vapor pressure build up.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. In the event of fire and/or explosion do not breathe fumes.
General fire hazards	Extremely flammable aerosol. Contents under pressure. Pressurized container may rupture when exposed to heat or flame.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Remove all possible sources of ignition in the surrounding area. Keep out of low areas. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Emergency personnel need self-contained breathing equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Stop leak if you can do so without risk. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Prevent product from entering drains. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Use appropriate containment to avoid environmental contamination.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. Pressurized container: Do not pierce or burn, even after use. Do not use if spray button is missing or defective. Do not spray on a naked flame or any other incandescent material. Do not smoke while using or until sprayed surface is thoroughly dry. Do not cut, weld, solder, drill, grind, or expose containers to heat, flame, sparks, or other sources of ignition. Do not breathe mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Level 3 Aerosol.

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50°C/122 °F. Do not puncture, incinerate or crush. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Avoid spark promoters. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	STEL	1000 ppm	
	TWA	500 ppm	
2,3-dimethylbutane (CAS 79-29-8)	STEL	1000 ppm	
	TWA	500 ppm	
2-methylhexane (CAS 591-76-4)	STEL	500 ppm	
	TWA	400 ppm	
2-methylpentane (CAS 107-83-5)	STEL	1000 ppm	
	TWA	500 ppm	
3,3-dimethylpentane (CAS 562-49-2)	STEL	500 ppm	
	TWA	400 ppm	
3-ethylpentane (CAS 617-78-7)	STEL	500 ppm	
	TWA	400 ppm	
3-methylhexane (CAS 589-34-4)	STEL	500 ppm	
	TWA	400 ppm	
3-methylpentane (CAS 96-14-0)	STEL	1000 ppm	
	TWA	500 ppm	
ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
methylcyclohexane (CAS 108-87-2)	STEL	500 ppm	
	TWA	400 ppm	
n-heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-hexane (CAS 110-54-3)	TWA	50 ppm	
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	TWA	5 mg/m3	Inhalable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	TWA	5 mg/m3	Inhalable fraction.
petrolatum (CAS 8009-03-8)	TWA	5 mg/m3	Inhalable fraction.
toluene (CAS 108-88-3)	TWA	20 ppm	
xylene (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
2,3-dimethylbutane (CAS 79-29-8)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
2-methylhexane (CAS 591-76-4)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
2-methylpentane (CAS 107-83-5)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
3,3-dimethylpentane (CAS 562-49-2)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
3-ethylpentane (CAS 617-78-7)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
3-methylhexane (CAS 589-34-4)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
3-methylpentane (CAS 96-14-0)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
ethylbenzene (CAS 100-41-4)	STEL	543 mg/m3	
		125 ppm	
	TWA	434 mg/m3	
		100 ppm	
methylcyclohexane (CAS 108-87-2)	STEL	2050 mg/m3	

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
		500 ppm	
	TWA	1610 mg/m3	
		400 ppm	
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)	TWA	1590 mg/m3	
		400 ppm	
n-heptane (CAS 142-82-5)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
n-hexane (CAS 110-54-3)	TWA	176 mg/m3	
		50 ppm	
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
petrolatum (CAS 8009-03-8)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
solvent naphtha (petroleum), light aliph. (CAS 64742-89-8)	TWA	1590 mg/m3	
		400 ppm	
toluene (CAS 108-88-3)	TWA	188 mg/m3	
		50 ppm	
xylene (CAS 1330-20-7)	STEL	651 mg/m3	
		150 ppm	
	TWA	434 mg/m3	
		100 ppm	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	TWA	200 ppm	
2,3-dimethylbutane (CAS 79-29-8)	TWA	200 ppm	
2-methylhexane (CAS 591-76-4)	STEL	500 ppm	
	TWA	400 ppm	
2-methylpentane (CAS 107-83-5)	TWA	200 ppm	
3,3-dimethylpentane (CAS 562-49-2)	STEL	500 ppm	
	TWA	400 ppm	
3-ethylpentane (CAS 617-78-7)	STEL	500 ppm	
	TWA	400 ppm	
3-methylhexane (CAS 589-34-4)	STEL	500 ppm	
	TWA	400 ppm	
3-methylpentane (CAS 96-14-0)	TWA	200 ppm	
ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
methylcyclohexane (CAS 108-87-2)	STEL	500 ppm	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
	TWA	400 ppm	
n-heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-hexane (CAS 110-54-3)	TWA	20 ppm	
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	TWA	1 mg/m3	Mist.
toluene (CAS 108-88-3)	TWA	20 ppm	
xylene (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	STEL	1000 ppm	
	TWA	500 ppm	
2,3-dimethylbutane (CAS 79-29-8)	STEL	1000 ppm	
	TWA	500 ppm	
2-methylhexane (CAS 591-76-4)	STEL	500 ppm	
	TWA	400 ppm	
2-methylpentane (CAS 107-83-5)	STEL	1000 ppm	
	TWA	500 ppm	
3,3-dimethylpentane (CAS 562-49-2)	STEL	500 ppm	
	TWA	400 ppm	
3-ethylpentane (CAS 617-78-7)	STEL	500 ppm	
	TWA	400 ppm	
3-methylhexane (CAS 589-34-4)	STEL	500 ppm	
	TWA	400 ppm	
3-methylpentane (CAS 96-14-0)	STEL	1000 ppm	
	TWA	500 ppm	
ethylbenzene (CAS 100-41-4)	TWA	20 ppm	
methylcyclohexane (CAS 108-87-2)	STEL	500 ppm	
	TWA	400 ppm	
n-heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-hexane (CAS 110-54-3)	TWA	50 ppm	
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	TWA	5 mg/m3	Inhalable fraction.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	TWA	5 mg/m3	Inhalable fraction.
petrolatum (CAS 8009-03-8)	TWA	5 mg/m3	Inhalable fraction.
toluene (CAS 108-88-3)	TWA	20 ppm	
xylene (CAS 1330-20-7)	STEL	150 ppm	
	TWA	100 ppm	

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
2,2-dimethylbutane (CAS 75-83-2)	STEL	1000 ppm

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
	TWA	500 ppm
2,3-dimethylbutane (CAS 79-29-8)	STEL	1000 ppm
	TWA	500 ppm
2-methylhexane (CAS 591-76-4)	STEL	500 ppm
	TWA	400 ppm
2-methylpentane (CAS 107-83-5)	STEL	1000 ppm
	TWA	500 ppm
3,3-dimethylpentane (CAS 562-49-2)	STEL	500 ppm
	TWA	400 ppm
3-ethylpentane (CAS 617-78-7)	STEL	500 ppm
	TWA	400 ppm
3-methylhexane (CAS 589-34-4)	STEL	500 ppm
	TWA	400 ppm
3-methylpentane (CAS 96-14-0)	STEL	1000 ppm
	TWA	500 ppm
ethylbenzene (CAS 100-41-4)	TWA	20 ppm
methylcyclohexane (CAS 108-87-2)	STEL	500 ppm
	TWA	400 ppm
n-heptane (CAS 142-82-5)	STEL	500 ppm
	TWA	400 ppm
n-hexane (CAS 110-54-3)	TWA	50 ppm
toluene (CAS 108-88-3)	TWA	20 ppm
xylene (CAS 1330-20-7)	STEL	150 ppm
	TWA	100 ppm

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
2,2-dimethylbutane (CAS 75-83-2)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
2,3-dimethylbutane (CAS 79-29-8)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
2-methylpentane (CAS 107-83-5)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
3-methylpentane (CAS 96-14-0)	STEL	3500 mg/m3	
		1000 ppm	
	TWA	1760 mg/m3	
		500 ppm	
ethylbenzene (CAS 100-41-4)	STEL	543 mg/m3	
		125 ppm	
	TWA	434 mg/m3	
		100 ppm	

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
methylcyclohexane (CAS 108-87-2)	TWA	1610 mg/m3	
		400 ppm	
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)	TWA	1590 mg/m3	
		400 ppm	
n-heptane (CAS 142-82-5)	STEL	2050 mg/m3	
		500 ppm	
	TWA	1640 mg/m3	
		400 ppm	
n-hexane (CAS 110-54-3)	TWA	176 mg/m3	
		50 ppm	
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
petrolatum (CAS 8009-03-8)	STEL	10 mg/m3	Mist.
	TWA	5 mg/m3	Mist.
solvent naphtha (petroleum), light aliph. (CAS 64742-89-8)	TWA	1590 mg/m3	
		400 ppm	
toluene (CAS 108-88-3)	TWA	188 mg/m3	
		50 ppm	
xylene (CAS 1330-20-7)	STEL	651 mg/m3	
		150 ppm	
	TWA	434 mg/m3	
		100 ppm	

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
ethylbenzene (CAS 100-41-4)	0.15 g/g	Sum of mandelic acid and phenylglyoxylic acid	Creatinine in urine	*
n-hexane (CAS 110-54-3)	0.4 mg/l	2,5-Hexanedion, without hydrolysis	Urine	*
toluene (CAS 108-88-3)	0.3 mg/g	o-Cresol, with hydrolysis	Creatinine in urine	*
	0.03 mg/l	Toluene	Urine	*
	0.02 mg/l	Toluene	Blood	*
xylene (CAS 1330-20-7)	1.5 g/g	Methylhippuric acids	Creatinine in urine	*

* - For sampling details, please see the source document.

Exposure guidelines

Canada - Alberta OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.
toluene (CAS 108-88-3)	Can be absorbed through the skin.

Canada - British Columbia OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.

Canada - Manitoba OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.

Canada - Ontario OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.

Canada - Quebec OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.
toluene (CAS 108-88-3)	Can be absorbed through the skin.

Canada - Saskatchewan OELs: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.
toluene (CAS 108-88-3)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

n-hexane (CAS 110-54-3)	Can be absorbed through the skin.

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.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear protective gloves such as: Nitrile. Polyvinyl chloride (PVC). Viton rubber (fluor rubber).

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with an organic vapor cartridge. Use a self-contained breathing apparatus in confined spaces and for emergencies. Air monitoring is needed to determine actual employee exposure levels.

Thermal hazards Not available.

General hygiene considerations When using do not smoke. 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.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Aerosol.

Color Dark red.

Odor Petroleum.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -244.7 °F (-153.7 °C) estimated

Initial boiling point and boiling range 118.4 °F (48 °C) estimated

Flash point < 0 °F (< -17.8 °C) Closed Cup

Evaporation rate Fast.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 1 % estimated

Flammability limit - upper (%) 8 % estimated

Vapor pressure 1453.1 hPa estimated

Vapor density Not available.

Relative density 0.73

Solubility(ies)

Solubility (water) Not available.

Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	489.2 °F (254 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Percent volatile	86.4 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Heat. Contact with incompatible materials.
Incompatible materials	Strong acids. Strong oxidizing agents. Halogens.
Hazardous decomposition products	Carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause damage to organs through prolonged or repeated exposure by inhalation. May cause drowsiness and dizziness. Headache. Nausea, vomiting.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	May cause damage to organs through prolonged or repeated exposure by ingestion. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.
Symptoms related to the physical, chemical and toxicological characteristics	Aspiration may cause pulmonary edema and pneumonitis. May cause drowsiness and dizziness. Narcosis. Headache. Nausea, vomiting. Behavioral changes. Decrease in motor functions. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Edema. Jaundice.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways.

Components	Species	Test Results
3-methylhexane (CAS 589-34-4)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	> 2000 mg/kg
ethylbenzene (CAS 100-41-4)		
Acute		
Inhalation		
LC50	Rat	17.2 mg/l, 4 hours
Oral		
LD50	Rat	3500 mg/kg
heptane, branched, cyclic and linear (CAS 426260-76-6)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Inhalation		
LC50	Rat	> 60 mg/l, 4 hours
Oral		
LD50	Rat	> 5000 mg/kg

Components	Species	Test Results
methylcyclohexane (CAS 108-87-2)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
n-heptane (CAS 142-82-5)		
Acute		
Dermal		
LD50	Rabbit	3000 mg/kg
n-hexane (CAS 110-54-3)		
Acute		
Dermal		
LD50	Rabbit	> 1300 mg/kg
Oral		
LD50	Rat	15840 mg/kg
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg
petrolatum (CAS 8009-03-8)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Inhalation		
LC50	Rat	> 20 mg/l, 4 hours
Oral		
LD50	Rat	> 2000 mg/kg
solvent naphtha (petroleum), light aliph. (CAS 64742-89-8)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
xylene (CAS 1330-20-7)		
Acute		
Oral		
LD50	Rat	4300 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Suspected of causing cancer.

ACGIH Carcinogens

ethylbenzene (CAS 100-41-4)	A3 Confirmed animal carcinogen with unknown relevance to humans.
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	A4 Not classifiable as a human carcinogen.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	A4 Not classifiable as a human carcinogen.
petrolatum (CAS 8009-03-8)	A4 Not classifiable as a human carcinogen.
toluene (CAS 108-88-3)	A4 Not classifiable as a human carcinogen.
xylene (CAS 1330-20-7)	A4 Not classifiable as a human carcinogen.

Canada - Manitoba OELs: carcinogenicity

ethylbenzene (CAS 100-41-4)	Confirmed animal carcinogen with unknown relevance to humans.
paraffin oils (petroleum), catalytic dewaxed heavy (CAS 64742-70-7)	Not classifiable as a human carcinogen.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	Not classifiable as a human carcinogen.
petrolatum (CAS 8009-03-8)	Not classifiable as a human carcinogen.
toluene (CAS 108-88-3)	Not classifiable as a human carcinogen.
xylene (CAS 1330-20-7)	Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

ethylbenzene (CAS 100-41-4)	2B Possibly carcinogenic to humans.
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)	3 Not classifiable as to carcinogenicity to humans.
toluene (CAS 108-88-3)	3 Not classifiable as to carcinogenicity to humans.
xylene (CAS 1330-20-7)	3 Not classifiable as to carcinogenicity to humans.

Reproductive toxicity Suspected of damaging fertility.

Specific target organ toxicity - single exposure May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure May cause damage to organs (central nervous system, kidney, liver) through prolonged or repeated exposure by ingestion.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Components		Species	Test Results
2-methylpentane (CAS 107-83-5)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia	1 - 10 mg/l, 48 hours
Fish	LC50	Fish	1 - 10 mg/l, 96 hours
ethylbenzene (CAS 100-41-4)			
Aquatic			
Fish	LC50	Atlantic silverside (Menidia menidia)	4.4 - 5.7 mg/l, 96 hours
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	2.1 mg/l, 48 hours
heptane, branched, cyclic and linear (CAS 426260-76-6)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.5 mg/l, 48 hours

Components		Species	Test Results
methylcyclohexane (CAS 108-87-2)			
Aquatic			
Fish	LC50	Striped bass (Morone saxatilis)	5.8 mg/l, 96 hours
naphtha (petroleum), hydrotreated light (CAS 64742-49-0)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia	1 - 10 mg/l, 48 hours
Fish	LC50	Fish	1 - 10 mg/l, 96 hours
n-heptane (CAS 142-82-5)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.5 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	2.1 - 2.98 mg/l, 96 hours
n-hexane (CAS 110-54-3)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours
paraffin oils (petroleum), catalytic dewaxed light (CAS 64742-71-8)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia	> 100 mg/l, 48 hours
solvent naphtha (petroleum), light aliph. (CAS 64742-89-8)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	8.8 mg/l, 96 hours
			8.8 mg/l, 96 hours
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	1.5 mg/l, 48 hours
toluene (CAS 108-88-3)			
Aquatic			
Acute			
Crustacea	EC50	Water flea (Daphnia magna)	6 mg/l, 48 hours
Fish	LC50	Coho salmon,silver salmon (Oncorhynchus kisutch)	5.5 mg/l, 96 hours
xylene (CAS 1330-20-7)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	9.54 - 19.2 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)	
2,2-dimethylbutane	3.82
2,3-dimethylbutane	3.42
2-methylpentane	3.74
3-methylpentane	3.6
ethylbenzene	3.15
methylcyclohexane	3.61
n-heptane	4.66
n-hexane	3.9
toluene	2.73
xylene	3.12 - 3.2
Bioconcentration factor (BCF)	
ethylbenzene	1

Bioconcentration factor (BCF)	
naphtha (petroleum), hydrotreated light	10 - 25000
toluene	90
xylene	23.99

Mobility in soil No data available.

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 of waste from residues / unused products Contents under pressure. Do not puncture, incinerate or crush. Empty container can be recycled. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code Not regulated.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

TDG

- **UN number** UN1950
- **UN proper shipping name** AEROSOLS, flammable, Limited Quantity
- **Transport hazard class(es)**
  - **Class** 2.1
  - **Subsidiary risk** -
- **Packing group** Not applicable.
- **Environmental hazards** No.
- **Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.
- **Special provisions** 80, 107

IATA

- **UN number** UN1950
- **UN proper shipping name** Aerosols, flammable, Limited Quantity
- **Transport hazard class(es)**
  - **Class** 2.1
  - **Subsidiary risk** -
- **Packing group** Not applicable.
- **Environmental hazards** No.
- **ERG Code** 10L
- **Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.
- **Other information**
  - **Passenger and cargo aircraft** Allowed with restrictions.
  - **Cargo aircraft only** Allowed with restrictions.

IMDG

- **UN number** UN1950
- **UN proper shipping name** AEROSOLS, Limited Quantity
- **Transport hazard class(es)**
  - **Class** 2
  - **Subsidiary risk** -
- **Packing group** Not applicable.
- **Environmental hazards**
  - **Marine pollutant** No.
- **EmS** F-D, S-U
- **Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

Canadian regulations

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Ontario. Toxic Substances. Toxic Reduction Act, 2009. Regulation 455/09 (July 1, 2011)

ethylbenzene (CAS 100-41-4)
toluene (CAS 108-88-3)
xylene (CAS 1330-20-7)

Precursor Control Regulations

toluene (CAS 108-88-3)	Class B

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto protocol

Not applicable.

Montreal Protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories

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

Issue date	01-12-2017
Revision date	10-13-2017
Version #	02
Further information	CRC # 597P-Q/1002627-1002629
Disclaimer	The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC's knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this (M)SDS consult your supervisor, a health & safety professional, or CRC Canada Co..

Revision Information	Product and Company Identification: Product Codes Composition/information on ingredients: Component information Other information: Further information

MATERIAL SAFETY DATA SHEET

Section 1 - Product and Company Identification

Brand Name: BEAUTI-TONE RUST COAT ACRYLIC
Item Number: 84-03
Material Code: 1825-007, 1825-008
Chemical Family: LATEX GLOSS CLEAR BASE CORROSION INHIBITING PAINT
Intended Use: LATEX PAINT
Preparation Date: 8 August 2017
Prepared By: PAINT LAB **Phone Number:** 519-449-2441

Emergency Phone Number: (613) 996-6666

Supplier:

Home Hardware Stores Limited
6 Brian Drive
Burford, ON
N0E 1A0

Manufacturer:

Home Hardware Stores Limited
6 Brian Drive
Burford, ON
N0E 1A0

Section 2 - Composition/Information on Ingredients

CAS No.	Description	LC50 (ml/m ^{3})	LD50 oral (mg/kg)	LD50 Dermal (mg/kg)	Range
107-21-1	ETHYLENE GLYCOL	2920 (RAT)	4700 (rat)	9500 (rabbit)	0.5% - 1.5%
34590-94-8	DIPROPYLENE GLYCOL MONOMETHYL ETHER	N/AV	5153 (rat)	9500 (rabbit)	1.0% - 5.0%

Section 3 - Hazards Identification

Emergency Overview: May cause skin or eye irritation.

Routes of Entry: Eye contact, skin contact, skin absorption, inhalation, and ingestion.

Eye: May cause eye irritation.

Skin absorption: Substance may be harmful if absorbed through skin.

Inhalation: May be harmful if vapours are inhaled.

Ingestion: May be harmful if swallowed.

Effects of Chronic Exposure to Product: Refer to Section 11.

Effects Of Acute Exposure: Refer to Section 11. MAY CAUSE EYE IRRITATION

Section 4 - First Aid Measures

Eye contact: Flush immediately with water for 15 mins. Get medical attention.

Skin contact: Immediately flush skin with plenty of water. Remove clothing. Get medical attention if irritation develops or persists. Contaminated clothing should be discarded in a manner of limiting further exposure.

Skin absorption: Immediately flush skin with plenty of water. Remove clothing. Get medical attention if irritation develops or persists. Contaminated clothing should be discarded in a manner limiting further exposure.

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Special training of first aid providers is required. Get medical attention.

Ingestion: Get medical attention immediately. Substance may be harmful if swallowed.

Section 5 - Fire Fighting Measures

Flash Point: N/AP

Flash Point Method:	N/AP
Upper Flammable Limit:	N/AP
Lower Flammable Limit:	N/AP
Autoignition:	N/AP
Hazardous Combustion Products:	OXIDES OF CARBON
Means of Extinction:	WATER FOG, DRY CHEMICAL, FOAM
Conditions Of Flammability:	NON-FLAMMABLE
Explosion Data	
Mechanical Impact:	NO
Static Discharge:	NO

Section 6 - Accidental Release Measures

Dispose of in accordance with regional regulations.

Section 7 - Handling and Storage

Handling Procedures and Equipment: Avoid contact with eyes, skin, and clothing.

Storage Requirements: Keep from freezing.

Section 8 - Exposure Control/Personal Protection

Specific Engineering Controls: Use adequate ventilation to reduce airborne vapour levels.

Personal Protective Equipment: Wear safety glasses with side shields and chemical resistant gloves. Use NIOSH approved respirator specified for protection against paint spray mist and organic vapours in restricted and confined areas. Use dust mask when sanding.

Exposure Limits: Consult local authorities for acceptable exposure limits.

Section 9 - Physical and Chemical Properties

Appearance:	CLEAR LIQUID
Odour:	MILD ODOUR
Vapour Pressure:	N/AV
Vapour Density:	N/AV
Physical State:	LIQUID
Boiling Point:	APPROX. 100C
Freezing/Melting Point:	APPROX. 0C
pH:	8.5-9.0
Evaporation Rate:	SLOWER THAN BUTYL ACETATE
Coefficient water/oil distr.:	N/AV
Odour Threshold:	N/AV
Specific Gravity:	1.0271

Section 10 - Stability and Reactivity

Stability: Yes.

Conditions to Avoid: High temperatures.

Materials to Avoid: None.

Hazardous Decomposition Products: Not available.

Hazardous Polymerization: Not available.

MATERIAL SAFETY DATA SHEET

Section 11 - Toxicological Information

Sensitization to Product: Possible from ethylene glycol and latex resin.

Carcinogenicity: Under normal use, no exposure to carcinogens.

May cause irritation due to ethylene glycol, dipropylene glycol monomethyl ether & latex resin.

Reproductive Toxicity: Not available.

Teratogenicity: Yes from ethylene glycol.

Mutagenicity: Not available.

Name of Toxicologically Synergistic Products: Not available.

Section 12 - Ecological Information

Not Available.

Section 13 - Disposal Considerations

Contact your local municipal office for specific disposal guidelines in your region.

Section 14 - Transport Information

TDG Road Classification

Shipping Name:	NOT REGULATED
Class:	NOT REGULATED
Packing Group:	NOT REGULATED
UN #:	NOT REGULATED
Limited Quantity Exemption:	NOT REGULATED

Section 15 - Regulatory Information

WHMIS Classification:	D2A, D2B
P.C.P. Registration #:	NOT APPLICABLE
EPA Registration #:	NOT APPLICABLE

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.

Section 16 - Other Information

N/AV: Not available
N/AP: Not applicable
NR: Not regulated

Information for this material safety data sheet was obtained from sources considered accurate and reliable, and was prepared to the best of Home Hardware Stores Limited knowledge. Actual conditions of use and handling beyond seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, Provincial and local laws and regulations.

Montgomery Chemicals
Sodium Borohydride and Related Chemicals

SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **BoroSpec 1240®** solution

Montgomery Chemicals LLC
901 Conshohocken Road
Conshohocken, PA 19428 USA
Tel: (610) 567-0877

Emergency Telephone
CHEMTREC (US & Canada): (800) 424-9300
CHEMTREC (Outside US): +1 (703) 527-3887
Revision Date: June 1, 2015

2. HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Corrosive to metals (Category 1), H290
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Dermal (Category 4), H312
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 3), H402

GHS Label Elements

Pictograms



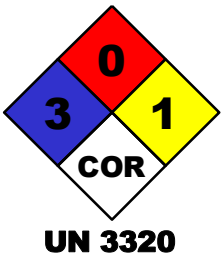
Signal Word: **Danger**

Hazard Statements:
H290 May be corrosive to metals.
H302 + H312 Harmful if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H402 Harmful to aquatic life.

Precautionary Statements:
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink, or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves, protective clothing, eye protection, and face protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P301 + P330+ P331 IF SWALLOWED: Rinse mouth. Do not induce vomiting.

P303 + P361 + P353 IF ON SKIN (or hair) take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338 + P310 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.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.

NFPA Hazards	Ratings
Health (Blue)	3
Flammability (Red)	0
Reactivity (Yellow)	1
Special Precautions (White)	COR (corrosive)



Ratings 0 to 4, where 4 is the most severe.

THIS MATERIAL IS HIGHLY CORROSIVE DUE TO THE CAUSTIC CONTENT (SODIUM HYDROXIDE).

IT CAUSES SEVERE BURNS OR OTHER DAMAGE TO SKIN, EYES, RESPIRATORY AND DIGESTIVE SYSTEM ORGANS. DO NOT SWALLOW. DO NOT INHALE VAPORS OR MISTS. IT MAY LIBERATE FLAMMABLE HYDROGEN GAS IF CONTACTED WITH ACIDS, OR CERTAIN METALS (SUCH AS ALUMINUM), OR IF DILUTED WITH LARGE QUANTITIES OF WATER.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	Formula	% by weight	CAS #
Sodium borohydride	$NaBH_4$	5 - 15%	16940-66-2
Sodium hydroxide	NaOH	20 - 45%	1310-73-2
Water	H_2O	Balance	

4. FIRST AID MEASURES

SKIN CONTACT: Remove contaminated clothing and shoes. Immediately flush affected skin with large amount of clean water. Use emergency shower if possible. Seek qualified medical attention immediately.

EYE CONTACT: Immediately flush eye(s) with large amount of clean water. Use emergency eyewash facilities if possible. Seek qualified medical attention immediately. Continue rinsing eyes during transport to hospital.

INHALATION (Breathing): Move to fresh air. If not breathing give artificial respiration. Seek medical attention if any abnormal sensations are experienced.

INGESTION (Swallowing): Seek medical help immediately. Rinse mouth well with clean water, and charcoal slurry if possible. Drink large quantity of water if possible. **Do not induce vomiting** unless directed to do so by qualified medical personnel. Never give anything by mouth to an unconscious person.

PHYSICIAN'S NOTICE: This material is highly alkaline, and can cause severe tissue damage. There is danger of further damage if lavage is performed. No attempt should be made to neutralize this material with acidic materials.

5. FIRE FIGHTING MEASURES

FLASH POINT, EXPLOSIVE LIMITS, and AUTO-IGNITION TEMPERATURE: This material does not burn or support combustion.

DECOMPOSITION PRODUCTS: Contact with oxidizing agents, certain metals (such as aluminum), acidic materials, excessive heating, and dilution with large quantities of water can result in flammable hydrogen gas being released. Burning produces irritating vapors. (See INHALATION information above).

FIRE AND EXPLOSION HAZARDS: Contact with oxidizing agents, certain metals (such as aluminum), acidic materials, excessive heating, and dilution with large quantities of water can result in flammable hydrogen gas being released.

EXTINGUISHING MEDIA: This material does not burn or support combustion.

FIRE FIGHTER'S NOTICE: Fire fighters and other personnel who may be exposed to this material in a fire should be equipped with NIOSH approved positive pressure self contained breathing apparatus (SCBA), and full protective clothing, such as eye protection, and rubber protective suits, boots, and gloves.

6. ACCIDENTAL RELEASE MEASURES

EVACUATION / PERSONNEL PRECAUTIONS: Evacuate area around spill, and keep unprotected personnel from contact with spilled liquid and airborne material if present. Remove all sources of ignition, as flammable hydrogen gas may be present with dilution of the material or if contact is made with acidic materials. Response personnel should wear proper personal protective equipment such as eye protection, a NIOSH approved respirator, rubber suits, gloves, and boots.

CONTAINMENT / DISPOSAL: Stop discharge as soon as practical. Contain spilled material using dikes or barriers. Material may be absorbed with dry sodium carbonate (soda ash), sand, or other inert absorbent materials. Place all collected liquid, contaminated absorbent and absorbed material in closed authorized containers and dispose of in accordance with applicable local, state and federal regulations.

CLEAN UP / PERSONAL PROTECTIVE EQUIPMENT: Wash any equipment, clothing etc. which has come in contact with material with warm water and soap or other cleaning materials.

REPORTING: Spills in the US of this material which exceed 1,000 lbs. must be reported to the National Response Center (800) 424-8802, plus the appropriate state and local emergency response agencies.

7. HANDLING AND STORAGE

STORAGE: Store in cool, dry well ventilated area, at temperatures between 65°F and 100°F (18°C and 38°C). Do not transfer to or store in aluminum, glass, or glass lined containers. Protect from freezing. Allow ±10% of container free volume for vapor space. Containers should be periodically checked for pressure buildup. Keep away from acidic materials, oxidizing agents, hot surfaces and ignition sources.

PERSONAL HYGIENE: Use rubber gloves, eye protection, rubber apron, or other approved protective clothing when handling. Wash all contaminated clothing and equipment thoroughly. Wash hands thoroughly after handling, particularly before eating, smoking, drinking or using rest room facilities.

EMPTY CONTAINERS: Empty containers may contain residues of this material, and should be considered hazardous until completely emptied and properly cleaned. Do not reuse empty container for any purpose until after it has been cleaned and inspected by appropriately trained personnel.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

ACGIH – TLV	(Sodium hydroxide)	2 mg/M^3
OSHA – PEL	(Sodium hydroxide)	2 mg/M^3

VENTILATION: Exhaust ventilation is recommended when vapors, dusts or mists in excess of established airborne limits (TLVs or PELs) may be exceeded.

EYE PROTECTION: Wear appropriate goggles, face shield, or other eye protection when handling. Eyewash fountains or other eyewash facilities should be readily available.

SKIN PROTECTION: Use rubber gloves, rubber apron, or other approved protective clothing when handling. Do not use cloth, leather or other absorbent gloves, as material will soak into them and cause skin contact. Emergency personnel showers should be readily available.

RESPIRATORY PROTECTION: Do not breathe dusts, aerosols or mists containing this material. Wear NIOSH/MSHA approved masks or other approved respiratory protection equipment. High airborne concentrations of this material may require the use of positive pressure self contained breathing apparatus (SCBA). Respiratory protection equipment and programs must be in compliance with 29 CFR 1910.134.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to slight yellow tint	VOC Material:	Not applicable
Physical state:	Liquid	% Non-volatiles	Approx. 25 - 60%
Odor:	None to mild hydrocarbon	Solubility in water:	Completely soluble
pH:	14+	Boiling point:	~270°F (~132°C)
Specific gravity:	1.4		

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under normal usage conditions. Refer to the information contained elsewhere in this document for conditions to avoid.

INCOMPATIBILITY WITH OTHER MATERIALS: Incompatible with acidic materials, oxidizing agents, chemically active metals (e.g. nickel, cobalt, iron, copper, etc.), amphoteric metals (e.g. copper, zinc, aluminum, etc.), large volumes of water. May react and/or release flammable hydrogen gas if contacted with any of these materials.

11. TOXICOLOGICAL INFORMATION

Oral LD50	Rat 500-1000 mg/kg
Dermal LD50	Rabbit 100-500 mg/kg

Can cause severe damage to skin, eyes, and respiratory system organs.

12. ECOLOGICAL INFORMATION

No data available.

13. DISPOSAL CONSIDERATIONS

This material meets RCRA's definitions for corrosivity and reactivity. Federal, state and local regulations may apply to disposal of this material, and/or containers which have been used to store or ship this material. Before disposing of any amount of this material, contact applicable regulatory authorities.

14. TRANSPORT INFORMATION

DOT (US)

Proper shipping name:	Sodium borohydride and sodium hydroxide solution
UN number:	3320
Class:	8
Packing group:	II
Label:	Corrosive
Reportable Quantity (RQ):	1,000 lbs (sodium hydroxide)

IMO/IMDG (International)

Proper shipping name:	Sodium borohydride and sodium hydroxide solution
UN number:	3320
Class:	8
Packing group:	II

15. REGULATORY INFORMATION

Federal — This material is considered hazardous under OSHA Hazard Communication Standard 29 CFR 1910.1200.

SARA Title III - Sec. 311/312 - Hazard Categories

Fire hazard -	No
Sudden release of pressure hazard -	No
Reactivity hazard -	Yes
Immediate (acute) health hazard -	Yes
Delayed (chronic) health hazard -	No
Ozone depleting chemicals -	No regulated ingredients

SARA Sec. 302 — Extremely Hazardous Materials - No regulated ingredients

SARA Sec. 313 — Extremely Hazardous Materials - No regulated ingredients

CHEMICAL LISTING - US Toxic Substances Control Act:
Chemical components in this product are listed in Section 8 (b) Chemical Substance Inventory List (40 CFR 710)

PA and NJ Right To Know

Sodium borohydride	16940-66-2	5 – 15%
Sodium hydroxide (Environmental hazard)	1310-73-2	20 – 45%
Water	7732-18-5	Balance

CA Proposition 65 — No regulated ingredients

CONEG — No data available.

CANADA This material is a "Controlled Product" under the Canadian Workplace Hazardous Materials Information System (Canadian WHMIS) Class D Div. 1 Subdiv A, Class D Div. 2 Subdiv B, and Class E Div. 0

CEPA-NPRI - No regulated ingredients

Canadian Chemical Inventory - Domestic Substances List - Listed

16. OTHER INFORMATION

USER'S RESPONSIBILITY: As with many chemicals, this material should be considered by the user, as well as any other individuals coming in contact with this material, as hazardous. The user of this material assumes all responsibility to provide a safe and properly equipped workplace in which this material can be used properly, and is responsible for determining whether any use of or procedure involving this material, or any equipment used to store, transport, or process this material, is safe. The user should relay safety and health hazard information pertaining to this material to any individuals or organizations who might be exposed to this material. Nothing contained herein is to be construed as permission to infringe on any patent or license.

DISCLAIMER OF LIABILITY: The information contained in this Material Safety Data Sheet is to the best of the manufacturer's knowledge and belief accurate. Since the conditions of transport, use, and handling of this material are not within the manufacturer's control, the manufacturer assumes no liability for damages incurred in the transport, use, or handling of this material, and makes no guarantee as to the results of the use of this material. While the information contained in this document is believed to be valid and complete, health hazards other than those mentioned herein may exist. The determination as to the use of this material for a specific application or in a specific manner is made solely at the discretion of the user. No representations, expressed or implied, of fitness for a particular purpose, merchantability, or any other nature are made herein. It is the responsibility of the user to use this material in conformance with all applicable federal, state, and local regulatory agency regulations.

Carbon dioxide,

Safety Data Sheet E-4574

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979 Revision date: 08-03-2016 Supersedes: 10-15-2014

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Name	:	Carbon dioxide,
CAS No	:	124-38-9
Formula	:	CO2
Other means of identification	:	Carbon anhydride, Carbonic acid gas, Carbon Dioxide,
Product group	:	Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions	:	Industrial use Medical applications Semiconductor Use as directed

1.3. Supplier

Praxair Canada inc.
1200 – 1 City Centre Drive
Mississauga - Canada L5B 1M2
T 1-905-803-1600 - F 1-905-803-1682
www.praxair.ca

1.4. Emergency telephone number

Emergency number	:	1-800-363-0042 Call emergency number 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.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Simple asphyxiant	H380
Compressed gas	H280

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



GHS04

Signal word : WARNING

Hazard statements : CONTAINS REFRIGERATED GAS; MAY CAUSE CRYOGENIC BURNS OR INJURY
MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
MAY CAUSE FROSTBITE
MAY INCREASE RESPIRATION AND HEART RATE

Precautionary statements : Do not handle until all safety precautions have been read and understood
Use and store only outdoors or in a well-ventilated area
Wear cold insulating gloves and either face shield or eye protection
Protect from sunlight when ambient temperature exceeds 52°C (125°F)
Use a back flow preventive device in the piping
Close valve after each use and when empty

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Always keep container in upright position
DO NOT change or force fit connections

2.3. Other hazards

Other hazards not contributing to the classification : Asphyxiant in high concentrations. Contact with liquid may cause cold burns/frostbite.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Carbon dioxide, (Main constituent)	(CAS No) 124-38-9	100	CARBON DIOXIDE

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : None.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

Explosion hazard : CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : DANGER! Extremely cold liquid and gas under pressure. Take care not to direct spray onto vents on top of container. Do not discharge sprays directly into liquid; cryogenic liquid can freeze water rapidly

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

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Special protective equipment for fire fighters	:	Use self-contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Specific methods	:	Stop flow of product if safe to do so. Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems. Use water spray or fog to knock down fire fumes if possible. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire. Exposure to fire may cause containers to rupture/explode.
Other information	:	Cryogenic liquid causes severe frostbite, a burn-like injury. Heat of fire can build pressure in a closed container and cause it to rupture. Venting vapors may obscure visibility. Air will condense on surfaces such as vaporizers or piping exposed to liquid or cold gas. Nitrogen, which has a lower boiling point than oxygen, evaporates first, leaving an oxygen-enriched condensate.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	:	Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Evacuate area. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Stop leak if safe to do so.

6.2. Methods and materials for containment and cleaning up

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	:	Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods **OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:** When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Carbon dioxide, (124-38-9)		
USA - ACGIH	ACGIH TLV-TWA (ppm)	5000 ppm
USA - ACGIH	ACGIH TLV-STEL (ppm)	30000 ppm

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Carbon dioxide, (124-38-9)		
USA - OSHA	OSHA PEL (TWA) (mg/m³)	9000 mg/m³
USA - OSHA	OSHA PEL (TWA) (ppm)	5000 ppm
Canada (Quebec)	VECD (mg/m³)	54000 mg/m³
Canada (Quebec)	VECD (ppm)	30000 ppm
Canada (Quebec)	VEMP (mg/m³)	9000 mg/m³
Canada (Quebec)	VEMP (ppm)	5000 ppm
Alberta	OEL STEL (mg/m³)	54000 mg/m³
Alberta	OEL STEL (ppm)	30000 ppm
Alberta	OEL TWA (mg/m³)	9000 mg/m³
Alberta	OEL TWA (ppm)	5000 ppm
British Columbia	OEL STEL (ppm)	15000 ppm
British Columbia	OEL TWA (ppm)	5000 ppm
Manitoba	OEL STEL (ppm)	30000 ppm
Manitoba	OEL TWA (ppm)	5000 ppm
New Brunswick	OEL STEL (mg/m³)	54000 mg/m³
New Brunswick	OEL STEL (ppm)	30000 ppm
New Brunswick	OEL TWA (mg/m³)	9000 mg/m³
New Brunswick	OEL TWA (ppm)	5000 ppm
New Foundland & Labrador	OEL STEL (ppm)	30000 ppm
New Foundland & Labrador	OEL TWA (ppm)	5000 ppm
Nova Scotia	OEL STEL (ppm)	30000 ppm
Nova Scotia	OEL TWA (ppm)	5000 ppm
Nunavut	OEL STEL (mg/m³)	27000 mg/m³
Nunavut	OEL STEL (ppm)	15000 ppm
Nunavut	OEL TWA (mg/m³)	9000 mg/m³
Nunavut	OEL TWA (ppm)	5000 ppm
Northwest Territories	OEL STEL (ppm)	30000 ppm
Northwest Territories	OEL TWA (ppm)	5000 ppm
Ontario	OEL STEL (ppm)	30000 ppm
Ontario	OEL TWA (ppm)	5000 ppm
Prince Edward Island	OEL STEL (ppm)	30000 ppm
Prince Edward Island	OEL TWA (ppm)	5000 ppm
Québec	VECD (mg/m³)	54000 mg/m³
Québec	VECD (ppm)	30000 ppm
Québec	VEMP (mg/m³)	9000 mg/m³
Québec	VEMP (ppm)	5000 ppm
Saskatchewan	OEL STEL (ppm)	30000 ppm
Saskatchewan	OEL TWA (ppm)	5000 ppm
Yukon	OEL STEL (mg/m³)	27000 mg/m³
Yukon	OEL STEL (ppm)	15000 ppm
Yukon	OEL TWA (mg/m³)	9000 mg/m³
Yukon	OEL TWA (ppm)	5000 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Oxygen detectors should be used when asphyxiating gases may be released. Ensure exposure is below occupational exposure limits (where available).

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8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : Safety glasses. Face shield. Gloves.



Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection : Wear goggles and a face shield when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Respiratory 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 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. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

Environmental exposure controls : None necessary.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 44 g/mol
Colour	: Colourless.
Odour	: No odour warning properties.
Odour threshold	: No data available
pH	: 3.7 (carbonic acid)
pH solution	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -78.5 °C
Freezing point	: No data available
Boiling point	: -78.4 °C
Flash point	: No data available
Critical temperature	: 31 °C
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: No data available
Vapour pressure	: 5730 kPa
Vapour pressure at 50 °C	: No data available
Critical pressure	: 7375 kPa
Relative vapour density at 20 °C	: No data available
Relative density	: 0.82
Relative density of saturated gas/air mixture	: No data available
Density	: 762 kg/m³
Relative gas density	: 1.52
Solubility	: Water: 2000 mg/l Completely soluble.
Log Pow	: 0.83

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Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	:	No data available
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Flammability (solid, gas)	:	Non flammable

9.2. Other information

Sublimation point	:	-78.5 °C
Gas group	:	Refrigerated liquefied gas
Additional information	:	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	:	No reactivity hazard other than the effects described in sub-sections below.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	None.
Conditions to avoid	:	None under recommended storage and handling conditions (see section 7).
Incompatible materials	:	Alkali metals, Alkaline earth metals, Acetylide forming metals, Chromium, Titanium > 1022°F (550°C), Uranium (U) > 1382°F (750°C), Magnesium > 1427°F (775°C).
Hazardous decomposition products	:	Electrical discharges and high temperatures decompose carbon dioxide into carbon monoxide and oxygen. The welding process may generate hazardous fumes and gases. If using carbon dioxide for welding and cutting, see Praxair SDS P-4574, Gaseous Carbon Dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified
Acute toxicity (inhalation)	:	Not classified

Additional information	Low concentrations of CO2 cause increased respiration and headache

Skin corrosion/irritation	:	Not classified pH: 3.7 (carbonic acid)
Serious eye damage/irritation	:	Not classified pH: 3.7 (carbonic acid)
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified

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SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Carbon dioxide, (124-38-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Carbon dioxide, (124-38-9)	
BCF fish 1	No bioaccumulation
Log Pow	0.83
Log Kow	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Carbon dioxide, (124-38-9)	
Mobility in soil	No data available.
Log Pow	0.83
Log Kow	Not applicable.
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Other adverse effects : Can cause frost damage to vegetation.

Effect on the ozone layer : None

Global warming potential [CO2=1] : 1

Effect on global warming : When discharged in large quantities may contribute to the greenhouse effect

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN1013

TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.

Proper shipping name : CARBON DIOXIDE

Explosive Limit and Limited Quantity Index : 0.125 L

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 75 L

14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 2187

Proper Shipping Name (IMDG) : CARBON DIOXIDE, REFRIGERATED LIQUID

Class (IMDG) : 2 - Gases

MFAG-No : 120

IATA

UN-No. (IATA) : 2187

Proper Shipping Name (IATA) : Carbon dioxide, refrigerated liquid

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Class (IATA) : 2

SECTION 15: Regulatory information

15.1. National regulations

Carbon dioxide, (124-38-9)
Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Carbon dioxide, (124-38-9)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican national Inventory of Chemical Substances)
Listed on CICR (Turkish Inventory and Control of Chemicals)

SECTION 16: Other information

Date of issue : 15/10/1979

Revision date : 03/08/2016

Supersedes : 15/10/2014

Indication of changes:

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.

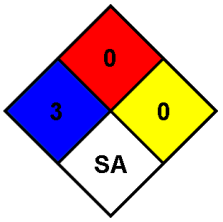
Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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

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 Safety Data Sheet. Since the use of this information and the conditions of use 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, SDSs are furnished on sale or delivery by Praxair Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.ca. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write Praxair Canada Inc, (Phone: 1-888-257-5149; Address: Praxair Canada Inc, 1 City Centre Drive, Suite 1200, Mississauga, Ontario, L5B 1M2).

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NFPA health hazard	: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	: 0 - Materials that will not burn.
NFPA reactivity	: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.
NFPA specific hazard	: SA - This denotes gases which are simple asphyxiants.



HMIS III Rating

Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 0 Minimal Hazard - Materials that will not burn
Physical	: 2 Moderate Hazard - Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

SDS Canada (GHS) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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Safety Data Sheet
acc. to OSHA HCS

Printing date 06/17/2014 Reviewed on 06/17/2014

1 Identification

· **Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE**

· **Article number:** P101S-A
· **MSDS Number:** 36
· **UPC bar code(s):** 699913-10020
· **Relevant identified uses of the substance:** INSPECTION DYE
· **Manufacturer/Supplier:**
WWW.CANTESCO.COM

USA ADDRESS:

KEMPER SYSTEM AMERICA, INC.
1200 NORTH AMERICA DR,
WEST SENECA, NY 14224
PH (716) 558-2971

CANADIAN ADDRESS:

KEMPER SYSTEM CANADA
13 -5200 DIXIE ROAD
MISSISSAUGA, ON L4W 1E4
PH (905) 624-5463
FAX (905) 624-2840

· **Information department:**
Tel: (716) 558-2971 ext. 228
www.cantesco.com
· **Emergency telephone number:**
ChemTrec (800) 424-9300
Canada only: CANUTEC (Call collect) (613) 996-6666

2 Hazard(s) identification

· **Classification of the substance or mixture:**


GHS02 Flame

Flam. Aerosol 1 H222 Extremely flammable aerosol.


GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.


GHS07

Acute Tox. 4 H302 Harmful if swallowed.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Signal word:** Danger

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Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE

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· **Hazard-determining components of labeling:**
Solvent naphtha (petroleum), heavy arom.
naphthalene
C.I. SOLVENT RED 164
· **Hazard statements:**
Extremely flammable aerosol.
Harmful if swallowed.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.
· **Precautionary statements:**
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Pressurized container: Do not pierce or burn, even after use.
Do not spray on an open flame or other ignition source.
Wear protective gloves / eye protection / face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
IF exposed or concerned: Get medical advice/attention.
Rinse mouth.
Do NOT induce vomiting.
IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
Store locked up.
Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **WHMIS-symbols:**
A - Compressed gas
B5 - Flammable aerosol
D2A - Very toxic material causing other toxic effects



· **NFPA ratings (scale 0 - 4):**



Health = 2
Fire = 4
Reactivity = 0

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
64742-94-5	Solvent naphtha (petroleum), heavy arom.	40-70%
68476-85-7	Petroleum gases, liquefied	25-30%
91-20-3	naphthalene	3-5%
112-34-5	2-(2-butoxyethoxy)ethanol	3-5%

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98-82-8	cumene	1-1.5%
95-63-6	1,2,4-trimethylbenzene	1-1.5%
71819-51-7	C.I. SOLVENT RED 164	0.3-<1%

· **Additional information:** Exact concentrations are being withheld as trade secrets.

4 First-aid measures

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water.
· **After swallowing:** Rinse mouth, do not induce vomiting, Immediately call a poison center / doctor.
· **Most important symptoms and effects, both acute and delayed:** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed:**
No further relevant information available.

5 Fire-fighting measures

· **Suitable extinguishing agents:** CO2, sand, extinguishing powder. Do not use water.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **Special hazards arising from the substance or mixture:** No further relevant information available.
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures:**
Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
· **Reference to other sections:**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling:**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
· **Information about protection against explosions and fires:**
Do not spray on a naked flame or any incandescent material.
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.

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Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE

(Contd. of page 3)

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

· **Storage**
· **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Observe official regulations on storing packagings with pressurized containers.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Keep receptacle tightly sealed.
Do not gas tight seal receptacle.
Store in cool, dry conditions in well sealed receptacles.
Protect from heat and direct sunlight.
· **Specific end use(s):** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Components with limit values that require monitoring at the workplace:**	
68476-85-7 Petroleum gases, liquefied	
EL	Short-term value: 1250 ppm Long-term value: 1000 ppm
91-20-3 naphthalene	
EL	Short-term value: 15 ppm Long-term value: 10 ppm Skin; IARC 2B
EV	Short-term value: 78 mg/m³, 15 ppm Long-term value: 52 mg/m³, 10 ppm
98-82-8 cumene	
EL	Short-term value: 75 ppm Long-term value: 25 ppm
EV	Long-term value: 245 mg/m³, 50 ppm Skin

· **Additional information:** The lists that were valid during the creation were used as basis.
· **Personal protective equipment**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
· **Breathing equipment:** Not required.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **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. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

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Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE

(Contd. of page 4)

· **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· **Form:**	Liquid Under Pressure
· **Color:**	Dark red
· **Odor:**	Aromatic
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	-68.3 °C
Boiling point/Boiling range:	132 °C
· **Flash point:**	-104 °C (Prop. (28.3℃ liq.))
· **Flammability (solid, gaseous):**	Extremely flammable liquefied gas.
· **Ignition temperature:**	227.8 °C
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· **Explosion limits**	
Lower:	.85 Vol %
Upper:	24.6 Vol %
· **Vapor pressure at 20 °C:**	70 psig
· **Density at 20 °C:**	0.775 g/cm³
· **Relative density:**	Not determined.
· **Vapour density at 20 °C:**	5.58 (AIR=1)
· **Evaporation rate:**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	6.9 %

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Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE

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· **Other information**

VOC Content:	763.954 g/l
VOC %:	99% (Wt)
HAP Content:	6.133 g/l
MIR Value:	5.946 g O_3/g

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions:** No dangerous reactions known.
· **Conditions to avoid:** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects:**
· **Acute toxicity**

· **LD/LC50 values that are relevant for classification:**		
91-20-3 naphthalene		
Oral	LD50	490 mg/kg (rat)
Dermal	LD50	5000 mg/kg (rat)
98-82-8 cumene		
Oral	LD50	1400 mg/kg (rat)
Dermal	LD50	12300 mg/kg (rabbit)
Inhalative	LC50/4 h	24.7 mg/l (mouse)
95-63-6 1,2,4-trimethylbenzene		
Oral	LD50	5000 mg/kg (rat)

· **Primary irritant effect**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**		
91-20-3	naphthalene	2B

· **NTP (National Toxicology Program)**		
91-20-3	naphthalene	R

12 Ecological information

· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability:** No further relevant information available.
· **Behavior in environmental systems**
· **Bioaccumulative potential:** No further relevant information available.
· **Mobility in soil:** No further relevant information available.

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Trade name: CANTESCO® VISIBLE DYE PENETRANT P101S – SOLVENT REMOVABLE

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· **Additional ecological information**
· **General notes:**
Water hazard class 2 (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
· **Other adverse effects:** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings**
· **Recommendation:**
Place in a sealed container and label as waste. Place in a safe area, and comply with all federal, state, provincial and local regulations for disposal.

14 Transport information

· **UN-Number**	
· **DOT, TDG, IMDG, IATA**	UN1950
· **UN proper shipping name**	
· **DOT**	Aerosols, flammable
· **TDG**	1950 Aerosols
· **IMDG**	AEROSOLS (NAPHTHALENE, CRUDE, ISOPROPYLBENZENE), MARINE POLLUTANT
· **IATA**	AEROSOLS, flammable

· **Transport hazard class(es)**

· **DOT**



· **Class**	2.1
· **Label**	2.1

· **TDG (Transport dangerous goods):**



· **Class**	2 5F Gases
· **Label**	2.1

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· **IMDG**



· **Class**	2.1
· **Label**	2.1

· **IATA**



· **Class**	2.1
· **Label**	2.1
· **Packing group**	
· **DOT, TDG, IMDG, IATA**	Not Available
· **Environmental hazards:**	Product contains environmentally hazardous substances: naphthalene
· **Marine pollutant:**	No Symbol (fish and tree)
· **Special marking (TDG):**	Symbol (fish and tree)
· **Special precautions for user:**	Warning: Gases
· **Danger code (Kemler):**	-
· **EMS Number:**	F-D,S-U
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Remarks:**	This product may be shipped according to the Limited Quantity Exceptions provided that all Limited Quantity shipping requirements are met.
· **TDG**	This product may be shipped according to the Limited Quantity Exceptions provided that all Limited Quantity shipping requirements are met.
· **IMDG**	
· **Remarks:**	This product may be shipped according to the Limited Quantity Exceptions provided that all Limited Quantity shipping requirements are met.
· **IATA**	
· **Remarks:**	This product may be shipped according to the Limited Quantity Exceptions provided that all Limited Quantity shipping requirements are met.
· **UN "Model Regulation":**	UN1950, Aerosols, 2.1

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

91-20-3	naphthalene
98-82-8	cumene
95-63-6	1,2,4-trimethylbenzene

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

91-20-3	naphthalene
98-82-8	cumene

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency):**

91-20-3	naphthalene	C, CBD
98-82-8	cumene	D, CBD

· **TLV (Threshold Limit Value established by ACGIH):**

91-20-3	naphthalene	A4

· **NIOSH-Ca (National Institute for Occupational Safety and Health):**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration):**
None of the ingredients is listed.

· **Canadian substance listings**

· **Canadian Domestic Substances List (DSL):**
All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%):**

95-63-6	1,2,4-trimethylbenzene

· **Canadian Ingredient Disclosure list (limit 1%):**

91-20-3	naphthalene
112-34-5	2-(2-butoxyethoxy)ethanol
98-82-8	cumene

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

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· **Hazard pictograms**



GHS02 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Solvent naphtha (petroleum), heavy arom.
naphthalene
C.I. SOLVENT RED 164

· **Hazard statements**
Extremely flammable aerosol.
Harmful if swallowed.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.

· **Precautionary statements**
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Pressurized container: Do not pierce or burn, even after use.
Do not spray on an open flame or other ignition source.
Wear protective gloves / eye protection / face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
IF exposed or concerned: Get medical advice/attention.
Rinse mouth.
Do NOT induce vomiting.
IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
Store locked up.
Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.
Dispose of contents/container in accordance with local/regional/national/international regulations.

16 Other information

This MSDS format meets ANSI Z400.1-1998, OSHA 1910.1200 and WHMIS requirements. Kemper System America, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Product use and conditions of use are beyond the control of Kemper System America, Inc. Warranty of materials is limited to test results of product performance as detailed in certificates of compliance. Interpretation of test results is the responsibility of end-user. No other warranties, expressed or implied, are made. Kemper System America, Inc is an ISO 9001:2008 registered company.

· **Department issuing MSDS:** Product safety department
· **Contact:** Stephen Nowicki
· **Abbreviations and acronyms:**
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)

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NFPA: National Fire Protection Association (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

Safety Data Sheet

Dust-Off Compressed Gas Duster

Section 1. Identification

Product Identifier	Dust-Off Compressed Gas Duster
Synonyms	Professional 12 oz.; Jumbo 17 oz.; Classic and Plus; Dust-Off¨ Compressed Gas Duster
Manufacturer Stock Numbers	N/A
Recommended use	Dust Removal
Uses advised against	Use Only as Directed - Read label instructions carefully
Manufacturer Contact	
Address	Falcon Safety Products, Inc. 25 ImClone Drive Branchburg, NJ, 08876 USA

Phone	Emergency Phone	Fax
(908) 707-4900	(800) 498-7192	N/A

Section 2. Hazards Identification

Classification	FLAMMABLE GASES - Category 2 GASES UNDER PRESSURE - Compressed gas
Signal Word	Warning
Pictogram	
Hazard Statements	Contains gas under pressure; may explode if heated Flammable gas
Precautionary Statements	
Response	Eliminate all ignition sources if safe to do so. Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Prevention	Do not spray on an open flame or other ignition source. Keep away from heat.

	Pressurized container: Do not pierce or burn, even after use.
Storage	Protect from sunlight. Store in a well-ventilated place. Store at temperatures not exceeding 120 degrees F/49 degrees C
Disposal	N/A
General	Keep out of reach of children
Ingredients of unknown toxicity	0%
Hazards not Otherwise Classified	N/A
	No Data Available

Section 3. Ingredients

CAS	Ingredient Name	Weight %
75-37-6	Ethane, 1,1-difluoro-	100 %

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-Aid Measures

General Advice	Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt, seek medical advice.
Inhalation	Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.
Skin	Take off all contaminated clothing immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
Eye	Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Ingestion	Is not considered a potential route of exposure.
Most important symptoms/effects, acute and delayed	Anaesthetic effects: light-headedness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.
Protection of First-aiders	If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to Physician	Because of possible disturbances of cardiac rhythm catecholamine drugs, such as epinephrine, which may be used in situations of emergency life support, should be used with special caution.

Section 5. Fire Fighting Measures

Suitable Extinguishing Media	Water spray, water fog, dry chemical, alcohol resistant foam, carbon dioxide (CO2)
Unsuitable Extinguishing Media	No applicable data available.
Specific Hazards	Flammable. This substance's fire decomposition by-products will include hydrofluoric acid and possibly carbonyl flouride. Avoid contact with these materials, which are toxic and irritating. Evacuate personnel immediately in the event of a fire involving this substance. Vapors may form explosive mixtures with air. Vapors are heavier than air and may spread along floors. Vapors or gases may travel considerable distances to ignition source and flash back.
Special protective equipment for firefighters	Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire. Exposure to decompositon products may be a hazard to health.
Further Information	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Cool containers/tanks with water spray.

Section 6. Accidental Release Measures

NOTE:	Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.
Safeguards (Personnel)	Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8.
Spill Clean-up	If this product is spilled and not recovered, or is recovered as a waste for treatment and disposal, the CERCLA Reportable Quantity is 100 lbs. (release of an Unlisted Hazardous Waste with the Characteristic of Ignitability). Evaporates. Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.
Accidental Release Measures	Wear self-contained breathing apparatus (SCBA).

Section 7. Handling and Storage

Handling (Personnel)	Avoid breathing vapors or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8. Handle in accordance with good industrial hygiene and safety practice.
Handling (Physical Aspects)	Vapors are heavier than air and may spread along floors. Vapors may form flammable mixture with air. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropirate standard. No sparking tools should be used. Take measures to prevent the build up of electrostatic charge. Keep away from open flames, hot surfaces and sources of ignition. When using DO NOT SMOKE. Do not use in areas where vapors may accumulate such as paper shredders.
Dust Explosion class	Not applicable
Storage	Keep container tightly closed and in a dry, well-ventilated location. Store in original container. The product has an indefinite shelf life when stored properly.
Storage Period	Recommended shelf life - 10 years provided product is stored in a dry location as directed.
Storage Temperature	Do not expose to temperatures above 120 degrees F (49 degrees C) as overheating could cause can to burst. DO NOT leave in direct sunlight or enclosed vehicle.

Section 8. Exposure Controls/Personal Protection

Occupational Exposure Limits	Ingredient Name	ACGIH TLV	OSHA PEL	STEL
	Ethane, 1,1-difluoro-	N/A	N/A	N/A
Personal Protective Equipment	N/A			
Engineering controls	Ensure adequate ventilation, especially in confined areas. Use respiratory protection if needed.			
Eye/Face Protection	Wear safety glasses with side shields. Direct contact with liquid may cause frostbite.			
Respiratory Protection	For rescue use self-contained breathing apparatus. Vapors are heavier than air and can cause suffication by reducing oxygen available for breathing.			
Skin and body protection	As required by employer code. If there is risk of skin contact, wear protective clothing, gloves, etc. Direct contact with liquid can cause frostbite.			
General Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practices. When using do not eat or drink. Wash hands and face before breaks and immediately after handling the product.			

Section 9. Physical and Chemical Properties

Physical State	Gas
Color	Clear
Odor	slight, ether-like
Odor Threshold	No applicable data available
Solubility	Water - Slightly
Partition coefficient Water/n-octanol	N/A
VOC%	N/A
Viscosity	No applicable data available
Specific Gravity	0.91
Density lbs/Gal	0.9
Pounds per Cubic Foot	N/A
Flash Point	<-58°F (<-50° C)
FP Method	N/A
Ph	Neutral
Melting Point	No applicable data available
Boiling Point	-13 °F (-25 ° C)
Boiling Range	N/A
LEL	3.9
UEL	16.9
Evaporation Rate	No applicable data available
Flammability	Flammable
Decomposition Temperature	N/A
Auto-ignition Temperature	No applicable data available
Vapor Pressure	5,960 KPa at 77F (25C)
Vapor Density	2.4 at 77F (25C) (Air=1)

Section 10. Stability and Reactivity

Reactivity	Stable under recommended storage conditions.
Chemical Stability	The product is chemically stable under recommended storage conditions.
Conditions to Avoid	Aerosol containers are unstable at temperatures above 120 degrees F/49 degrees C
Incompatible Materials	Incompatible products include Alkali metals, Alkaline earth metals, powdered metals, powdered metal salts.
Hazardous Decomposition Products	Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride.

Section 11. Toxicological Information

Component Analysis - LC50	1,1-Difluoroethane - > 64000 ppm rat
Component analysis - Oral LD50	1,1-Difluoroethane - 1500 mg/kg rat
Effects of Acute Exposure - Eye	Contact with liquid may cause frostbite
Effects of Acute Exposure - Skin	Contact with liquid may cause frostbite
Effects of Acute Exposure - Inhalation	Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effect (headaches, dizziness). Vapors may cause dizziness or suffocation.
Effects of Acute Exposure - Ingestion	Not a normal route of exposure
Sensitization	Non-hazardous by WHMIS/OSHA criteria.
Carcinogenicity	Not classifiable as a human carcinogen. Animal testing did not show carcinogenic effects. None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA as a carcinogen.
Mutagenicity	Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells. Tests on mammalian cell cultures showed mutagenic effects.
Reproductive Toxicity	No toxcicity to reproduction. Animal testing showed no reproductive toxicity.
Teratogenicity	Animal testing showed no developmental toxicity.
Further Information	Cardiac sensitization threshold limit: 405000 mg/m3

Section 12. Ecological Information

Aquatic Toxicity	1,1-Difluoroethane 96 h LC50 : Fish 295.78 mg/l 96 h EC50 : Algae 47.76 mg/l 48 h EC50 : Daphnia (water flea) 146.7 mg/l

Section 13. Disposal

Waste Disposal Methods	Comply with applicable Federal, State/Provincial and Local Regulations. May be a RCRA Hazardous waste due to the ignitability characteristic. Do not puncture or incinerate container.
Contaminated Packaging	Not Available

Section 14. Transport Information

UN Number	1030
UN Proper Shipping Name	1,1-Difluoroethane
DOT Classification	2.1
Packing Group	N/A
Packaging Exceptions	Note: Falcon Safety Products has been granted a DOT special permit. A copy of DOT Special Permit SP-11516 can be obtained by calling Falcon Safety Products, Inc. at 908-707-4900.
Transportation of Dangerous Goods (TDG - Canada)	Proper Shipping name: 1,1-Difluoroethane Hazard Class: 2.1 UN number: 1030 Packaging Exceptions: Limited quantity (containers up to 125mL)
IATA/ICAO (Air)	Proper Shipping Name: 1,1-Difuoroethane. Hazard Class: 2.1. UN Number: 1030. Maximum Net Quantity Packaging: Cargo Aircraft only - 150 kg maximum (forbidden on passenger aircraft). Maximum Net Quantity packaging cargo only: 150 kg.
IMDG (Marine Transport)	Proper Shipping Name: 1,1-DIFLUOROETHANE. Hazard Class: 2.1. UN Number: 1030.
Additional Information	TDG Canada: Falcon Safety Products has been granted Equivalency Certificate SU 9211 (ren. 1) by the TCSS, TDGD to offer for transport by road, rail and marine.

Section 15. Regulatory Information

Canadian Federal Regulations	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.
WHMIS Status	Controlled
WHMIS Classification	Class A - Compressed Gas, Class B - Division 1 - Flammable Gas
TSCA	On the inventory, or in compliance with the inventory.
SARA 313 Regulated Chemical(s)	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
US Federal Regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
NJ Right to Know Regulated Chemical(s)	Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): 1,1-Difluoroethane.
California Prop. 65	This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.
Canada Domestic Substances List (DSL)	This product is listed on the DSL inventory list and complies with the inventory requirements administered by the governing country.

Section 16. Other Information

Revision Date	4/28/2015
Disclaimer	Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.
Prepared By	Falcon Safety Products, Inc. 908-707-4900

SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY

Product name: FILL AND SEAL™ Expanding Foam Sealant 12oz HC ES STW 12ct **Issue Date:** 01/19/2016

Print Date: 06/16/2016

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

1. IDENTIFICATION

Product name: FILL AND SEAL™ Expanding Foam Sealant 12oz HC ES STW 12ct

Recommended use of the chemical and restrictions on use
Identified uses: Polyurethane foam.

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2030 WILLARD H DOW CENTER
MIDLAND MI 48674-0000
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.
Flammable aerosols - Category 2
Gases under pressure - Liquefied gas
Skin irritation - Category 2
Eye irritation - Category 2B
Respiratory sensitisation - Category 1
Skin sensitisation - Category 1
Effects on or via lactation
Specific target organ toxicity - single exposure - Category 3
Specific target organ toxicity - repeated exposure - Category 2 - Inhalation

Label elements
Hazard pictograms



Signal word: **DANGER!**

Hazards
Flammable aerosol.
Contains gas under pressure; may explode if heated.
Causes skin and eye irritation.
May cause an allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause respiratory irritation.
May cause harm to breast-fed children.
May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Precautionary statements

Prevention
Obtain special instructions before use.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Do not spray on an open flame or other ignition source.
Pressurized container: Do not pierce or burn, even after use.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Avoid contact during pregnancy/ while nursing.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.
Wear protective gloves.
In case of inadequate ventilation wear respiratory protection.

Response
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.
If skin irritation or rash occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.

Storage
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Polyurethane prepolymer
This product is a mixture.

Component	CASRN	Concentration
Diphenylmethane Diisocyanate, isomers and homologues	9016-87-9	>= 10.0 - <= 30.0 %
Polymethylenepolyphenylisocyanate, propoxylated glycerin polymer	57029-46-6	>= 30.0 - <= 60.0 %
Polymethylenepolyphenyl polyisocyanate, polypropyleneglycol copolymer	53862-89-8	>= 10.0 - <= 30.0 %
Tris(1-chloro-2-propyl) phosphate	13674-84-5	>= 5.0 - <= 10.0 %
Paraffin waxes and Hydrocarbon waxes, chlorinated	63449-39-8	>= 5.0 - <= 10.0 %
Isobutane	75-28-5	>= 5.0 - <= 10.0 %
Methyl ether	115-10-6	>= 1.0 - <= 5.0 %
Propane	74-98-6	>= 1.0 - <= 5.0 %
4,4' -Methylenediphenyl diisocyanate	101-68-8	>= 5.0 - <= 10.0 %

Note
Note: CAS 101-68-8 is an MDI isomer that is part of CAS 9016-87-9.

4. FIRST AID MEASURES

Description of first aid measures
General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands. Suitable emergency safety shower facility should be available in work area.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome). Repeated excessive exposure may aggravate preexisting lung disease. Maintain adequate ventilation and oxygenation of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Exposure may increase "myocardial irritability". Do not administer sympathomimetic drugs such as epinephrine unless absolutely necessary. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. Although cholinesterase depression has been reported with this material, it is not of benefit in determining exposure and need not be considered in the treatment of persons exposed to the material. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire.

Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Isocyanates. Hydrogen chloride. Carbon monoxide. Carbon dioxide. Hydrogen cyanide.

Unusual Fire and Explosion Hazards: Contains flammable propellant. Aerosol cans exposed to fire can rupture and become flaming projectiles. Propellant release may result in a fireball. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Dense smoke is produced when product burns.

Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Use water spray to cool fire-exposed containers and fire-affected zone until fire is out.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep personnel out of low areas. Keep personnel out of confined or poorly ventilated areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. See Section 10 for more specific information. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Confined space entry procedures must be followed before entering the area. Refer to section 7, Handling, for additional precautionary measures.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Ground and bond all containers and handling equipment. Isolate area until gas has dispersed. Use non-sparking tools in cleanup operations. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Collect in suitable and properly labeled containers. Absorb with materials such as: Clay. Dirt. Milsorb®. Sand. Sawdust. Vermiculite. See Section 10 for more specific information. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Keep away from heat, sparks and flame. Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Keep container closed. Use only with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Contents under pressure. Do not puncture or incinerate container. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Do not enter confined spaces unless adequately ventilated. Never use air pressure for transferring product. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Minimize sources of ignition, such as static build-up, heat, spark or flame. Store in a dry place. See Section 10 for more specific information.

Storage stability

Storage temperature:	Storage Period:
25 °C (77 °F)	12 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Isobutane	ACGIH	STEL	1,000 ppm
Methyl ether	US WEEL	TWA	1,000 ppm
Propane	ACGIH		Asphyxiant
	OSHA Z-1	TWA	1,800 mg/m3 1,000 ppm
4,4' -Methylenediphenyl diisocyanate	Dow IHG	TWA	0.005 ppm
	Dow IHG	STEL	0.02 ppm
	ACGIH	TWA	0.005 ppm
	OSHA Z-1	C	0.2 mg/m3 0.02 ppm
	NIOSH REL	TWA	0.05 mg/m3 0.005 ppm
	NIOSH REL	C	0.2 mg/m3 0.02 ppm

Exposure controls

Engineering controls: Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. The odor and irritancy of this material are inadequate to warn of excessive exposure. Lethal concentrations may exist in areas with poor ventilation.

Individual protection measures

Eye/face protection: Use safety glasses (with side shields).

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Viton. Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (air line or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.
The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Foam
Color	Yellow
Odor	Mild
Odor Threshold	No test data available
pH	*Not applicable*
Melting point/range	No test data available
Freezing point	No test data available
Boiling point (760 mmHg)	Not applicable
Flash point	**closed cup** -104 °C (-155 °F) *Estimated.*
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	No data available
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapor Pressure	1,151 kPa at 55 °C (131 °F) *Calculated.*
Relative Vapor Density (air = 1)	No test data available
Relative Density (water = 1)	1.06 *Estimated.*
Water solubility	Insoluble

Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No test data available
Decomposition temperature	No test data available
Kinematic Viscosity	Not applicable
Explosive properties	Not explosive
Oxidizing properties	No
Molecular weight	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7. Unstable at elevated temperatures.

Possibility of hazardous reactions: Can occur. Exposure to elevated temperatures can cause product to decompose and generate gas. This can cause pressure build-up and/or rupturing of closed containers. Acids.

Conditions to avoid: Avoid temperatures above 50 °C
Elevated temperatures can cause container to vent and/or rupture. Exposure to elevated temperatures can cause product to decompose.

Incompatible materials: Avoid contact with: Acids. Alcohols. Amines. Ammonia. Bases. Metal compounds. Strong oxidizers. Products based on diisocyanates like TDI and MDI react with many materials to release heat. The reaction rate increases with temperature as well as with increased contact; these reactions can become violent. Contact is increased by stirring or if the other material acts as a solvent. Products based on diisocyanates such as TDI and MDI are not soluble in water and will sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea. Reaction with water will generate carbon dioxide and heat.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Toxic gases are released during decomposition.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Observations in animals include: Gastrointestinal irritation.

As product: Single dose oral LD50 has not been determined.

LD50, Rat, > 2,000 mg/kg Estimated.

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

LD50, Rabbit, > 2,000 mg/kg Estimated.

Acute inhalation toxicity
In confined or poorly ventilated areas, vapor can easily accumulate and can cause unconsciousness and death due to displacement of oxygen. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. May cause pulmonary edema (fluid in the lungs.) Effects may be delayed. May cause central nervous system depression. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed. Excessive exposure may increase sensitivity to epinephrine and increase myocardial irritability (irregular heartbeats). Decreased lung function has been associated with overexposure to isocyanates.

The LC50 has not been determined.,

Skin corrosion/irritation
Prolonged contact may cause moderate skin irritation with local redness.
Material may stick to skin causing irritation upon removal.
May stain skin.

Serious eye damage/eye irritation
May cause eye irritation.
May cause slight temporary corneal injury.

Sensitization
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest.
Occasionally, breathing difficulties may be life threatening.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.
Contains component(s) which have been reported to cause effects on the following organs in animals: kidney

Liver.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Teratogenicity
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

Reproductive toxicity
Based on information for component(s): May cause harm to breastfed babies.

Mutagenicity
In vitro genetic toxicity studies were negative for component(s) tested. Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Carcinogenicity

Component	**List**	**Classification**
Paraffin waxes and Hydrocarbon waxes, chlorinated	IARC	Group 2B: Possibly carcinogenic to humans
	US NTP	Reasonably anticipated to be a human carcinogen

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Diphenylmethane Diisocyanate, isomers and homologues

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

Polymethylenepolyphenylisocyanate, propoxylated glycerin polymer

Acute toxicity to fish
For this family of materials:
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Polymethylenepolyphenyl polyisocyanate, polypropyleneglycol copolymer

Acute toxicity to fish
Not expected to be acutely toxic to aquatic organisms.

Tris(1-chloro-2-propyl) phosphate

Acute toxicity to fish
Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).
LC50, Lepomis macrochirus (Bluegill sunfish), static test, 96 Hour, 84 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), 48 Hour, 131 mg/l

Acute toxicity to algae/aquatic plants
ErC50, Pseudokirchneriella subcapitata (green algae), static test, 96 Hour, Growth rate inhibition, 82 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
EC50, activated sludge, Respiration inhibition, 3 Hour, 784 mg/l, OECD 209 Test

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 32 mg/l
LOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, > 32 mg/l

Paraffin waxes and Hydrocarbon waxes, chlorinated

Acute toxicity to fish
Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

LC50, Oncorhynchus mykiss (rainbow trout), 96 Hour, > 0.1 mg/l

Isobutane

Acute toxicity to fish
No relevant data found.

Methyl ether

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Poecilia reticulata (guppy), semi-static test, 96 Hour, > 4,000 mg/l

Acute toxicity to aquatic invertebrates
LC50, Daphnia magna (Water flea), 48 Hour, > 4,000 mg/l, OECD Test Guideline 202 or Equivalent

Propane

Acute toxicity to fish
No relevant data found.

4,4' -Methylenediphenyl diisocyanate

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

Persistence and degradability

Diphenylmethane Diisocyanate, isomers and homologues

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

Polymethylenepolyphenylisocyanate, propoxylated glycerin polymer

Biodegradability: For this family of materials: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Polymethylenepolyphenyl polyisocyanate, polypropyleneglycol copolymer

Biodegradability: Expected to degrade slowly in the environment.

Tris(1-chloro-2-propyl) phosphate

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 14 %
Exposure time: 28 d
Method: OECD Test Guideline 301E or Equivalent
10-day Window: Not applicable
Biodegradation: 95 %
Exposure time: 64 d
Method: OECD Test Guideline 302A or Equivalent

Theoretical Oxygen Demand: 1.17 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 0.24 d
Method: Estimated.

Paraffin waxes and Hydrocarbon waxes, chlorinated

Biodegradability: Expected to degrade slowly in the environment.

Theoretical Oxygen Demand: 2.89 mg/mg

Isobutane

Biodegradability: Biodegradation may occur under aerobic conditions (in the presence of oxygen).

Theoretical Oxygen Demand: 3.58 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 4.4 d

Method: Estimated.

Methyl ether

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent

Theoretical Oxygen Demand: 2.08 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 6.4 d
Method: Estimated.

Propane

Biodegradability: No relevant data found.

Theoretical Oxygen Demand: 3.64 mg/mg

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 8.4 d
Method: Estimated.

4,4' -Methylenediphenyl diisocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

Bioaccumulative potential

Diphenylmethane Diisocyanate, isomers and homologues

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Reacts with water. In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.
Bioconcentration factor (BCF): 92 Cyprinus carpio (Carp) 28 d

Polymethylenepolyphenylisocyanate, propoxylated glycerin polymer

Bioaccumulation: No relevant data found.

Polymethylenepolyphenyl polyisocyanate, polypropyleneglycol copolymer

Bioaccumulation: In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Tris(1-chloro-2-propyl) phosphate

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 2.59 Measured
Bioconcentration factor (BCF): 0.8 - 4.6 Cyprinus carpio (Carp) 42 d Measured

Paraffin waxes and Hydrocarbon waxes, chlorinated

Bioaccumulation: Bioconcentration potential is low (BCF less than 100 or log Pow greater than 7).
Partition coefficient: n-octanol/water(log Pow): 7.4 Estimated.

Isobutane

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 2.76 Measured

Methyl ether

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 0.10 Measured

Propane

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 2.36 Measured

4,4' -Methylenediphenyl diisocyanate

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Reacts with water. In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.
Bioconcentration factor (BCF): 92 Cyprinus carpio (Carp) 28 d

Mobility in soil

Diphenylmethane Diisocyanate, isomers and homologues

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Polymethylenepolyphenylisocyanate, propoxylated glycerin polymer

No relevant data found.

Polymethylenepolyphenyl polyisocyanate, polypropyleneglycol copolymer

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Tris(1-chloro-2-propyl) phosphate

Potential for mobility in soil is slight (Koc between 2000 and 5000).
Partition coefficient(Koc): 1300 Estimated.

Paraffin waxes and Hydrocarbon waxes, chlorinated

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Expected to be relatively immobile in soil (Koc > 5000).
Partition coefficient(Koc): > 5000 Estimated.

Isobutane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 35 Estimated.

Methyl ether

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 1.29 - 14 Estimated.

Propane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 24 - 460 Estimated.

4,4' -Methylenediphenyl diisocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Aerosols
UN number	UN 1950
Class	2.1
Packing group	

Classification for SEA transport (IMO-IMDG):

Proper shipping name	AEROSOLS
UN number	UN 1950
Class	2.1
Packing group	
Marine pollutant	Paraffin waxes and Hydrocarbon waxes, chlorinated
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Aerosols, flammable
UN number	UN 1950
Class	2.1
Packing group	

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

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

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Acute Health Hazard
Chronic Health Hazard
Fire Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Components	**CASRN**
Diphenylmethane Diisocyanate, isomers and homologues	9016-87-9
4,4' -Methylenediphenyl diisocyanate	101-68-8

Pennsylvania Worker and Community Right-To-Know Act:
The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	**CASRN**
Isobutane	75-28-5
Methyl ether	115-10-6
Propane	74-98-6

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Revision
Identification Number: 101194255 / A001 / Issue Date: 01/19/2016 / Version: 8.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
Asphyxiant	Asphyxiant
C	Ceiling
Dow IHG	Dow Industrial Hygiene Guideline
NIOSH REL	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
STEL	Short term exposure limit
TWA	Time weighted average
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

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

SAFETY DATA SHEET

Revision Date 24-Mar-2016 **Version** 4

1. IDENTIFICATION

Product identifier
Product Name FAST ORANGE PUMICE LOTION HAND CLEANER 15 FL.OZ

Other means of identification
Product Code 25122
Synonyms None

Recommended use of the chemical and restrictions on use
Recommended Use Hand Cleaner or Soap - Heavy Duty
Uses advised against No information available

Details of the supplier of the safety data sheet

Manufacturer Address
ITW Permatex
6875 Parkland Blvd.
Solon, OH 44139 USA

Distributor
ITW Permatex Canada
35 Brownridge Road, Unit 1
Halton Hills, ON Canada L7G 0C6
Telephone: (800) 924-6994

Company Phone Number 1-87-Permatex
(877) 376-2839

24 Hour Emergency Phone Number Chem-Tel: 800-255-3924
International Emergency:
00+1+ 813-248-0585
Contract Number: MIS0003453

E-mail address mail@permatex.com

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance White **Physical state** Lotion **Odor** Citrus

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
- May cause sensitization especially in sensitive humans

Unknown acute toxicity 12.01 % of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

substance(s)

Chemical Name	CAS No	Weight-%	Trade Secret
WATER	7732-18-5	60 - 100	*
PUMICE	1332-09-8	5 - 10	*
ETHOXYLATED C11-C16 ALCOHOL	127036-24-2	1 - 5	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of first aid measures

General advice Get medical advice/attention if you feel unwell.

Eye contact IF IN EYES:. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists: Get medical advice/attention.

Skin contact None under normal use conditions.

Inhalation None under normal use conditions.

Ingestion IF SWALLOWED:. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider Avoid contact with eyes.

Most important symptoms and effects, both acute and delayed

Symptoms See section 2 for more information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Carbon dioxide (CO2), Dry chemical, Foam

Unsuitable extinguishing media
None.

Specific hazards arising from the chemical
None in particular.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with eyes.

Environmental precautions

Environmental precautions Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Ensure adequate ventilation. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep container tightly closed in a dry and well-ventilated place. Keep from freezing.

Incompatible materials Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .
Appropriate engineering controls

Engineering Controls Eyewash stations

Individual protection measures, such as personal protective equipment

Eye/face protection No special technical protective measures are necessary.

Skin and body protection None under normal use conditions.

Respiratory protection None under normal use conditions.

General Hygiene Considerations Avoid contact with eyes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Lotion

Appearance	White
Odor	Citrus
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	6.0-8.5	
Melting point / freezing point	No information available	
Boiling point / boiling range	> 100 °C / >212 °F	
Flash point	> 95 °C / > 203 °F	
Evaporation rate	> 1	Butyl acetate = 1
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	>1	Air = 1
Relative density	1.06	
Water solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	<1%
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Excessive heat. Keep from freezing.

Incompatible materials
Strong oxidizing agents

Hazardous Decomposition Products
Carbon oxides

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation None known.

Eye contact Contact with eyes may cause irritation. May cause redness and tearing of the eyes.

Skin contact Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Ingestion None known.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
WATER 7732-18-5	> 90 mL/kg (Rat)	-	-

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

IARC (International Agency for Research on Cancer)
Group 2A - Probably Carcinogenic to Humans
Not classifiable as a human carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 382796 mg/kg
ATEmix (dermal) 435430 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

97.65 % of the mixture consists of components(s) of unknown hazards to the aquatic environment

Persistence and degradability
No information available.

Bioaccumulation
No information available.

Mobility
No information available.

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

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

Contaminated packaging Do not reuse container.

US EPA Waste Number Not applicable

14. TRANSPORT INFORMATION

DOT

Proper shipping name: Not regulated

IATA

Proper shipping name: Not regulated

IMDG

Proper shipping name: Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Not Listed.
ENCS	Not Listed.
IECSC	Complies
KECL	Not Listed.
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
LANOLIN 8006-54-0	-	-	X

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

WHMIS Hazard Class
Non-controlled

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA	**Health hazards** 1	**Flammability** 1	**Instability** 0	-
HMIS	**Health hazards** 1	**Flammability** 1	**Physical hazards** 0	**Personal protection** B

NFPA (National Fire Protection Association)
HMIS (Hazardous Material Information System)

Revision Date 24-Mar-2016

Disclaimer
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.

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET

by Tyco Fire Suppression & Building Products

FORAY

Product Code: 2001-2-015 ANa Issue Date: 07-30-2010

1. Product and Company Identification

Material name	**FORAY**
Version #	01
Revision date	07-30-2010
CAS #	Mixture
Product Code	2001-2-015 ANa
Product use	Fire extinguishing agent
Manufacturer / Importer / Supplier	
Name	Tyco Fire Suppression and Building Products
Address	One Stanton Street Marinette, WI 54143-2542
Phone	715-735-7411
Internet	http://www.ansul.com
Emergency Phone Number	CHEMTREC 800-424-9300 or 703-527-3887

2. Hazards Identification

Emergency overview	WARNING Irritating to eyes and skin.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Eye contact. Skin contact. Inhalation. Ingestion.
Eyes	Avoid contact with eyes. Contact with eyes may cause irritation.
Skin	Avoid contact with the skin. May cause skin irritation.
Inhalation	Inhalation of dusts may cause respiratory irritation.
Ingestion	Not a likely route of entry.
Target organs	Eyes. Respiratory system. Skin.
Signs and symptoms	Irritation of eyes and mucous membranes.

3. Composition / Information on Ingredients

Hazardous components	**CAS #**	**Percent**
CALCIUM CARBONATE	471-34-1	1 - 2.5
Non-hazardous components	**CAS #**	**Percent**
Pigment Yellow 14	5468-75-7	0 - 0.1
Silicone fluid	63148-57-2	0.1 - 1
FULLERS EARTH	8031-18-3	2.5 - 10
Ammonium Sulfate	7783-20-2	10 - 20
Ammonium Phosphate	7722-76-1	60 - 80

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation persists after washing.

Skin contact	Wash off with warm water and soap. Get medical attention if irritation develops and persists.
Inhalation	Move to fresh air. Get medical attention, if needed.
Ingestion	Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Notes to physician	Symptoms may be delayed.
General advice	If you feel unwell, seek medical advice (show the label where possible). 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

Flammable properties	No unusual fire or explosion hazards noted.
Extinguishing media	
Suitable extinguishing media	This product is not flammable. Use extinguishing agent suitable for type of surrounding fire.
Protection of firefighters	
Specific hazards arising from the chemical	None known.
Hazardous combustion products	Carbon monoxide and carbon dioxide.

6. Accidental Release Measures

Personal precautions	Local authorities should be advised if significant spillages cannot be contained. Avoid inhalation of dust from the spilled material. Wear a dust mask if dust is generated above exposure limits.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water.
Methods for containment	If sweeping of a contaminated area is necessary use a dust suppressant agent which does not react with the product. Prevent entry into waterways, sewer, basements or confined areas.
Methods for cleaning up	Should not be released into the environment. Sweep up or vacuum up spillage and collect in suitable container for disposal. Collect dust using a vacuum cleaner equipped with HEPA filter. Avoid dust formation. Following product recovery, flush area with water.
Other information	Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling	Keep formation of airborne dusts to a minimum. Do not breathe dust. Avoid contact with eyes. Do not use in areas without adequate ventilation. Wear personal protective equipment. Wash thoroughly after handling.
Storage	Keep container tightly closed. Guard against dust accumulation of this material. Use care in handling/storage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
CALCIUM CARBONATE (471-34-1)	PEL	5.0000 mg/m3	Respirable fraction.
		15.0000 mg/m3	Total dust.
	TWA	5.0000 mg/m3	Respirable fraction.
		15.0000 mg/m3	Total dust.

Engineering controls	Ensure adequate ventilation, especially in confined areas.
Personal protective equipment	
Eye / face protection	Do not get in eyes. Chemical goggles are recommended.
Skin protection	No special protective equipment required.
Respiratory protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
General hygiene considerations	Do not get in eyes.

9. Physical & Chemical Properties

Appearance	
Form	Powder.
Color	Yellow.
Odor	Odorless.
Physical state	Solid.
pH	Not available.
Melting point	Not available.
Freezing point	Not available.
Boiling point	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Specific gravity	Not available.
Relative density	Not available.
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
VOC	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Incompatible materials	Strong acids.
Hazardous decomposition products	Carbon oxides.

11. Toxicological Information

Toxicological information The toxicity of this product has not been tested.

Toxicological data

Components	Test Results
CALCIUM CARBONATE (471-34-1)	Acute Oral LD50 Rat: 6450 mg/kg

Local effects	Components of the product may be absorbed into the body through the skin. Contact may irritate or burn eyes.
Chronic effects	Hazardous by OSHA criteria. Prolonged inhalation may be harmful.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

12. Ecological Information

Ecotoxicological data

Components	Test Results
CALCIUM CARBONATE (471-34-1)	LC50 Western mosquitofish (Gambusia affinis): > 56000 mg/l 96.00 Hours
Ammonium Sulfate (7783-20-2)	EC50 Water flea (Ceriodaphnia dubia): 52 - 67 mg/l 48.00 hours
	LC50 Pink salmon (Oncorhynchus gorbuscha): 0.068 mg/l 96.00 hours

Ecotoxicity	This material is not expected to be harmful to aquatic life.
Environmental effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Persistence and degradability	Not available.

13. Disposal Considerations

Disposal instructions	This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.
Waste from residues / unused products	Dispose of in accordance with local regulations.

14. Transport Information

DOT

Not regulated as dangerous goods.

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.

CERCLA/SARA Hazardous Substances - Not applicable.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Ammonium Phosphate (CAS 7722-76-1)	1.0 %
Ammonium Sulfate (CAS 7783-20-2)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Ammonium Phosphate (CAS 7722-76-1)	Listed.
Ammonium Sulfate (CAS 7783-20-2)	Listed.

CERCLA (Superfund) reportable quantity

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Acute Health - Yes Chronic Health - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No

Inventory status

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)	No
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)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Ammonium Sulfate (CAS 7783-20-2)	Listed.
CALCIUM CARBONATE (CAS 471-34-1)	Listed.

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings
Health: 1*
Flammability: 0
Physical hazard: 0

NFPA ratings
Health: 1
Flammability: 0
Instability: 0

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Issue date 07-30-2010

SAFETY DATA SHEET

Section 1. IDENTIFICATION

Product Identifier

Product Name	GASOILA® SOFT SET.

Other means of Identification

Product Code	SS01, SS02, SS04, SS08, SS16, SS32, SB32, SS28..
Recommended Use	Pipe Thread Sealant.
Recommended Restrictions	None Known.

Manufacturer

Company Name	Federal Process Corporation
Address	4520 Richmond Road Cleveland OH 44128
Telephone	1-800-846-7325
Emergency Telephone Number:	Call Chemtrec at 1-800-424-9300

Section 2. HAZARDS IDENTIFICATION

PHYSICAL STATE: Liquid

Classification:

Flammable	Category 3
Serious eye damage/eye irritation	Category 2
Skin sensitization	Category 1

Signal Word: Warning



Hazard Statements:

H226 - Flammable liquid and vapor.
H302 – Harmful if swallowed.
H319 – Causes serious eye irritation.
H317 – May cause an allergic skin reaction

Precautionary Statements:

Prevention:	P210 – Keep away heat, sparks, open flames, and hot surfaces. No smoking. P261 – Avoid breathing dust/fume/gas/mist/vapors/spray. P272 – Contaminated clothing should not be allowed out of the workplace.
Response:	P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P301 + P331 + P310 – IF SWALLOWED: Do NOT induce vomiting. Immediately call POISON CENTER or doctor/physician. P337 + P313–If eye irritation persists: Get medical advice/attention. P332 + P313 – If skin irritation or rash occurs: Get medical advice/attention.
Disposal:	P501- Dispose of contents/container to an approved waste disposal plant.
Other Hazards:	Toxic to aquatic life with long lasting effects.
Unknown Acute Toxicity:	2% of the mixture consists of ingredient(s) of unknown toxicity.

Section 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight %
Isopropyl alcohol	67-63-0	<8.0
2 butoxyethanol	111-76-2	<5.0

Section 4. FIRST AID MEASURES

First Aid Measures:

Eye Contact	Rinse thoroughly with plenty of water, for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
Skin Contact	If skin irritation occurs, rinse affected area with water. If skin irritation or rash occurs: Get medical advice/attention.
Inhalation	Remove to fresh air. If signs/symptoms continue, get medical attention. Give oxygen or artificial respiration as needed.

Ingestion	Do NOT induce vomiting Get medical attention immediately. Rinse mouth with water. Never give anything by mouth to an unconscious individual.

Most Important Symptoms and effects:

Symptoms	Direct contact with eyes may cause temporary irritation. Do NOT ingest.

Section 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Use foam, dry chemical, carbon dioxide or water fog.

Unsuitable Extinguishing Media: Not determined.

Specific Hazards Arising from the Chemical:
Carbon oxides expected to be the primary hazardous combustion product.

Protective Equipment and Precautions for Firefighters:
As in any fire, wear self-contained breathing apparatus and other protective clothing. (approved or equivalent) and full protective gear.

Section 6. ACCIDENTAL RELEASE MEASURES

–

Personal Precautions, Protective Equipment and Emergency Procedures:

Personal Precautions: Use personal protective equipment as required. Keep unnecessary personnel away.

Methods and Material for Containment and Cleaning Up:

Methods for Containment: Prevent further leakage or spillage if safe to do so.

Methods for Clean-Up: Keep in suitable, closed containers for disposal.

Section 7. HANDLING AND STORAGE

Precautions for Safe Handling:

Advice on Safe Handling: Avoid breathing vapors or mists. Contaminated work-clothing should not be allowed out of the workplace.

Conditions for Safe Storage, including
Any Incompatibilities:

Storage Conditions:	Keep containers tightly closed in a dry, cool and well-ventilated place. Do not store near heat, sparks, or open flames. KEEP OUT OF REACH OF CHILDREN.
Incompatible Materials:	None known based on information supplied.

Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Chemical Name	ACGIH TWA	ACGIH STEL	OSHA TWA
Isopropyl alcohol (CAS 67-63-0)	200 ppm	400 ppm	400 ppm
2 butoxyethanol (CAS 111-76-2)	20 ppm	200 mg/g	x

Appropriate Engineering Controls:

Engineering Controls:	Apply technical measures to comply with the occupational exposure limits.

Individual Protection Measures, such as
Personal Protective Equipment:

Eye/Face Protection:	Avoid contact with eyes.
Skin and Body Protection:	No protective equipment is needed under normal use conditions.
Respiratory Protection:	Ensure adequate ventilation, especially in confined areas. If confined in poorly ventilated areas use NIOSH/MSHA
General Hygiene Considerations:	Handle in accordance with good industrial hygiene and safety practice. Wash exposed areas thoroughly before eating, drinking, smoking or leaving work area. Launder contaminated clothing before reusing.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State:	Liquid.	Odor:	Mild alcoholic.
Appearance:	Viscous liquid.	Odor Threshold:	Not available.
Color:	Blue green.		

Property	Values
pH	N/A
Melting Point/Freezing Point	Not determined.
Boiling Point/Boiling Range	Not determined.

Flash Point	98F (37C) Closed Cup.
Evaporation Rate	Not determined.
Flammability (Solid, Gas)	n/a-liquid
Upper Flammability Limit	Not determined.
Lower Flammability Limit	Not determined.
Vapor Pressure	Not determined.
Vapor Density	Not determined.
Specific Gravity	1.44
Water Solubility	None.
Solubility in other Solvents	Not determined.
Partition Coefficient (n-octanol/water)	Not determined.
Auto-ignition Temperature	Not determined.
Decomposition Temperature	Not determined.
Kinematic Viscosity	Not determined.
Explosive Properties	Not determined.
Oxidizing Properties	Not determined

Section 10. STABILITY AND REACTIVITY

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Reactivity:	Not reactive under normal conditions.
Chemical Stability:	Stable under recommended storage conditions.
Possibility of Hazardous Reactions:	None under normal processing.
Conditions to Avoid:	Keep out of reach of children.
Incompatible Materials:	None known.
Hazardous Decomposition Products:	Oxides of carbon.

Section 11. TOXICOLOGICAL INFORMATION

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Information on Likely Routes of Exposure:

Eye Contact:	Causes serious eye irritation.
Skin Contact:	May cause an allergic skin reaction.

Inhalation: Avoid breathing vapors or mists.

Ingestion: Do not taste or swallow.

Component Information:

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Isopropyl alcohol (67-63-0)	4,396 mg/kg (Rat) 3,600 mg/kg (Mouse)	12,870 mg/kg (Rabbit)	19,600 ppm (Rat)
2 butoxyethanol (111-76-2)	1,300mg/g (Rat) 1,400 mg/g (Guinea Pig)	>2,000 mg/g (Rat) >2,000 mg/g (Guinea Pig)	>4.9 mg/L (Rat 3 h) >3.4 mg/L (Guinea Pig 1h)

Information on physical, chemical and toxicological effects:

Symptoms: Please section 4 of this SDS for symptoms.

Delayed and Immediate Effects as Well as Chronic Effects From Short and Long Term Exposure:

Sensitization: May cause an allergic skin reaction.

Carcinogenicity: Not classifiable as a human carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Isopropyl alcohol (67-63-0)	NO	NO	NO	NO
2 butoxyethanol (111-76-2)	NO	NO	NO	NO

Legend
IARC (International Agency for Research on Cancer).
Group3 IARC components are “not classifiable as human carcinogens”.
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

Numerical Measures of Toxicity:

Not Determined.

Section 12. ECOLOGICAL INFORMATION

Ecotoxicity:

Toxic to aquatic life with lasting effects.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Isopropyl alcohol (67-63-0)	EC50/72 hours Scenedesmus subspicatus >1,000 mg/L	LC50/96 hours Pimephales promelas: 9,640 mg/L	EC50/3 hours Activated sludge >1,000 mg/L	N/A
2 butoxyethanol (111-76-2)	EC50 Algae (Pseudokircheriella subcapitata, 72h) 1,840 mg/L	LC50/96 hours Oncorhynchus mykiss, 1,474 mg/L		

Persistence/Degradability: Not determined.

Bioaccumulation: Not determined.

Mobility: Not determined.

Other Adverse Effects: Not determined.

Section 13. DISPOSAL CONSIDERATIONS

Waste Treatment Method:

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

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

Section 14. TRANSPORT INFORMATION

DOT: Consumer Commodity ORM-D.

PROPER SHIPPING NAME: Consumer Commodity ORM-D.

IATA: ID8000 Consumer Commodity.

IMDG: FLAMMABLE LIQUID N.O.S. (contains Alcohol) 3
IDENTIFICATION NUMBER: UN1993, III

Section 15. REGULATORY INFORMATION

International Inventories:	Not determined.
U.S. Federal Regulations:	Not determined.
SARA Title 313:	Not determined.
U.S. State Regulations:	
U.S Right-to-Know Regulations:	Not determined.

Section 16. OTHER INFORMATION

NFPA:	Health Hazards	Flammability	Instability	Special Hazards
	1	2	0	Not determined
HMIS	Health Hazards	Flammability	Instability	Special Hazards
	1	2	0	Not determined

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Issue Date: 1St March 2014

Revision Date: 1st July 2016

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End of Safety Data Sheet

GOJO® NATURAL* ORANGE™ Smooth Hand Cleaner

Version 1.0 SDS Number: 400000000196 Revision Date: 11/17/2016

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : GOJO® NATURAL* ORANGE™ Smooth Hand Cleaner

Manufacturer or supplier's details

Company name of supplier : GOJO Industries, Inc.

Address : One GOJO Plaza, Suite 500
Akron, Ohio 44311

Telephone : 1 (330) 255-6000

Emergency telephone number : 1-800-424-9300 CHEMTREC

Recommended use of the chemical and restrictions on use

Recommended use : Skin-care

Restrictions on use : This is a personal care or cosmetic product that is safe for consumers and other users under normal and reasonably foreseeable use. Cosmetics and consumer products, specifically defined by regulations around the world, are exempt from the requirement of an SDS for the consumer. While this material is not considered hazardous, this SDS contains valuable information critical to the safe handling and proper use of the product for industrial workplace conditions as well as unusual and unintended exposures such as large spills. This SDS should be retained and available for employees and other users of this product. For specific intended-use guidance, please refer to the information provided on the package or instruction sheet.

Prepared by :

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Physical state	liquid
Colour	opaque, white, grey
Odour	citrus

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Potential Health Effects

Primary Routes of Entry	:	Inhalation Eye contact 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.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical name	CAS-No.	Concentration (%)
C11-15 Alkane/cycloalkane	64742-47-8	>= 5 - < 10
Limonene	5989-27-5	>= 0.1 - < 1

SECTION 4. FIRST AID MEASURES

General advice	:	In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.
If inhaled	:	If inhaled, remove to fresh air. If symptoms persist, call a physician.
In case of skin contact	:	Wash with water and soap as a precaution. Get medical attention immediately if irritation develops and persists.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Seek medical advice.
If swallowed	:	If swallowed, DO NOT induce vomiting. Rinse mouth with water. Obtain medical attention.
Most important symptoms and effects, both acute and delayed	:	None known.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	:	None known.
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers.
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

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	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Keep in suitable, closed containers for disposal. Clean contaminated floors and objects thoroughly while observing environmental regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Do not swallow. Avoid contact with eyes. Keep container closed when not in use.
Conditions for safe storage	:	Keep in properly labelled containers. Keep container tightly closed in a dry and well-ventilated place. Store in accordance with the particular national regulations.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
C11-15 Alkane/cycloalkane	64742-47-8	TWA	200 mg/m3 (As total hydrocarbon vapour)	CA BC OEL
		TWA	200 mg/m3 (As total hydrocarbon vapour)	CA AB OEL
		TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (As total hydrocarbon vapour)	CA BC OEL
		TWA (Mist)	5 mg/m3	CA AB OEL
		STEL (Mist)	10 mg/m3	CA AB OEL
		TWAEV (Mist)	5 mg/m3	CA QC OEL
		STEV (Mist)	10 mg/m3	CA QC OEL
		TWA	525 mg/m3	CA ON OEL
		TWA	200 mg/m3 (as total hydrocarbon vapor)	ACGIH
Limonene	5989-27-5	TWA	20 ppm 111 mg/m3	CA AB OEL
		TWA	20 ppm 111 mg/m3	CA AB OEL
		TWA	20 ppm	ACGIH

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

Eye protection : No special protective equipment required.
Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection : No special protective equipment required.

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

the specific work-place.

Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	opaque, white, grey
Odour	:	citrus
Odour Threshold	:	No data available
pH	:	6 - 8, (20 °C)
Melting point/range	:	11.4 °C
Initial boiling point and boiling range	:	95 °C
Flash point	:	> 100 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Density	:	0.9758 g/cm3
Solubility(ies) Water solubility	: :	 soluble
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Thermal decomposition	:	The substance or mixture is not classified self-reactive.
Viscosity Viscosity, kinematic	: :	 10000 - 45000 mm2/s (20 °C)
Explosive properties	:	Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.

Incompatible materials : Oxidizing agents

Hazardous decomposition products : No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:

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

Acute inhalation toxicity : LC50 (Rat): > 5.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rabbit): > 3,160 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Limonene:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Assessment: The substance or mixture has no acute oral toxicity
Remarks: Based on data from similar materials

Skin corrosion/irritation

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:

Assessment: Repeated exposure may cause skin dryness or cracking.

Limonene:
Species: Rabbit
Result: Skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:
Species: Rabbit
Result: No eye irritation

Limonene:
Species: Rabbit
Result: No eye irritation

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.

Product:

Assessment: Does not cause skin sensitisation.

Components:

C11-15 Alkane/cycloalkane:
Test Type: Maximisation Test (GPMT)
Exposure routes: Skin contact
Species: Guinea pig
Result: negative
Remarks: Based on data from similar materials

Limonene:
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin contact
Species: Mouse
Result: positive

Assessment: Probability or evidence of skin sensitisation in humans

Germ cell mutagenicity

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:

Genotoxicity in vitro	:	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo	:	Test Type: Chromosomal aberration Test species: Rat Application Route: Intraperitoneal injection Result: negative Remarks: Based on data from similar materials

Limonene:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Genotoxicity in vivo : Test Type: Transgenic rodent somatic cell gene mutation assay
Test species: Rat
Application Route: Ingestion
Result: negative

Carcinogenicity

Not classified based on available information.

Components:

Limonene:
Species: Mouse
Application Route: Ingestion
Exposure time: 103 weeks
Result: negative

Reproductive toxicity

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:

Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Repeated dose toxicity

Components:

C11-15 Alkane/cycloalkane:
Species: Rat
NOAEL: > 10.4 mg/l
Application Route: inhalation (vapour)
Exposure time: 90 d
Remarks: Based on data from similar materials

Limonene:
Species: Rat
NOAEL: 600 mg/kg
Application Route: Ingestion

Exposure time: 13 w

Aspiration toxicity

Not classified based on available information.

Components:

C11-15 Alkane/cycloalkane:
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Limonene:
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

C11-15 Alkane/cycloalkane:

Toxicity to fish	:	LL50 (Danio rerio (zebra fish)): > 250 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Acartia tonsa): > 3,193 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction
Toxicity to algae	:	EL50 (Skeletonema costatum (marine diatom)): > 3,200 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction NOELR (Skeletonema costatum (marine diatom)): 993 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOELR (Ceriodaphnia Dubia (water flea)): > 70 mg/l Exposure time: 8 d Test substance: Water Accommodated Fraction
Toxicity to bacteria	:	EC50: > 100 mg/l Exposure time: 3 h

Limonene:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 0.72 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 0.36 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 150 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction

Remarks: Based on data from similar materials

M-Factor (Acute aquatic toxicity) : 1

Persistence and degradability

Components:

C11-15 Alkane/cycloalkane:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 82 %
Exposure time: 24 d
Method: OECD Test Guideline 301F

Limonene:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 80 %
Exposure time: 28 d
Remarks: Based on data from similar materials

Bioaccumulative potential

Components:

Limonene:
Partition coefficient: n-octanol/water : log Pow: 4.38

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

National Regulations

TDG

Not regulated as a dangerous good

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:

TSCA	:	On TSCA Inventory
CH INV	:	On the inventory, or in compliance with the inventory
AICS	:	On the inventory, or in compliance with the inventory
DSL	:	All components of this product are on the Canadian DSL.
ENCS	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
ISHL	:	On the inventory, or in compliance with the inventory
NZIoC	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory

Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

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Hydrogen chloride

Safety Data Sheet P-4606

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1984 Revision date: 10/17/2016 Supersedes: 03/19/2015

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Hydrogen chloride
CAS No	:	7647-01-0
Formula	:	HCl
Other means of identification	:	Anhydrous hydrochloric acid

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Liquefied gas	H280
Acute Tox. 3 (Inhalation:gas)	H331
Skin Corr. 1A	H314
Eye Dam. 1	H318

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS04 GHS05 GHS06

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE
H331 - TOXIC IF INHALED
CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P261 - Avoid breathing gas
P262 - Do not get in eyes, on skin, or on clothing
P271+P403 - Use and store only outdoors or in a well-ventilated place
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection
P405 - Store locked up
P501 - Dispose of contents/container Dispose in a safe manner in accordance with local/national regulations

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CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG06 - Close valve after each use and when empty
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Hydrogen chloride (Main constituent)	(CAS No) 7647-01-0	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.

First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Does not burn. Use extinguishing agents compatible with acid and appropriate for the burning material.

5.2. Special hazards arising from the substance or mixture

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER! Toxic, corrosive, liquefied gas.**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

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Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Toxic. Corrosive.** Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Evacuate personnel to a safe area. Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrogen chloride (7647-01-0)		
ACGIH	ACGIH TLV-C (ppm)	2 ppm
USA OSHA	OSHA PEL (Ceiling) (mg/m³)	7 mg/m³
USA OSHA	OSHA PEL (Ceiling) (ppm)	5 ppm
USA IDLH	US IDLH (ppm)	50 ppm
ACGIH	Not established	

8.2. Exposure controls

Appropriate engineering controls : Use a corrosion-resistant local exhaust ventilation system with sufficient air flow velocity to maintain concentration below all applicable exposure limits in the worker's breathing zone. A canopy-type, forced-draft fume hood is preferred.

Hand protection : Neoprene rubber (HNBR) /.

Eye protection : Provide readily accessible eye wash stations and safety showers. Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Colorless gas.

Molecular mass : 36.5 g/mol

Color : Colorless. Gives off white fumes in moist air.

Odor : Pungent.

Odor threshold : No data available

pH : Not applicable.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable.

Melting point : -114 °C

Freezing point : No data available

Boiling point : -85 °C

Flash point : Not applicable.

Critical temperature : 51.4 °C

Auto-ignition temperature : Not applicable.

Decomposition temperature : No data available

Flammability (solid, gas) : Not Applicable

Vapor pressure : 4260 kPa

Critical pressure : 8310 kPa

Relative vapor density at 20 °C : No data available

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Relative density	:	1.2
Density	:	1.161 - 1.19 g/cm³ (at 20 °C)
Relative gas density	:	1.3
Solubility	:	Water: 720000 mg/l
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	0.092 cSt Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	Non flammable.

9.2. Other information

Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

Most common metals and their alloys. Bases. unsaturated organics. metal carbides. Fluorine. metal acetylides. potassium permanganate. sulfuric acid.

10.6. Hazardous decomposition products

Hydrogen. Chlorine. Chlorides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: TOXIC IF INHALED.

Hydrogen chloride (\f)7647-01-0	
LD50 oral rat	238 - 277 mg/kg
LD50 dermal rabbit	> 5010 mg/kg
LC50 inhalation rat (ppm)	3120 ppm/1h
ATE US (oral)	238.000 mg/kg body weight
ATE US (gases)	1560.000 ppmV/4h

Skin corrosion/irritation : CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.

pH: Not applicable.

Serious eye damage/irritation : CAUSES SERIOUS EYE DAMAGE.

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

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Hydrogen chloride (7647-01-0)	
IARC group	3 - Not classifiable

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Hydrogen chloride (7647-01-0)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Hydrogen chloride (7647-01-0)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Hydrogen chloride (7647-01-0)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1050 Hydrogen chloride, anhydrous, 2.3

UN-No.(DOT) : UN1050

Proper Shipping Name (DOT) : Hydrogen chloride, anhydrous

Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Hazard labels (DOT) : Poison Gas
2.3 - Poison gas
8 - Corrosive



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DOT Special Provisions (49 CFR 172.102)	:	3 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone C (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter N86 - UN pressure receptacles made of aluminum alloy are not authorized N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized

Additional information

Emergency Response Guide (ERG) Number	:	125 (UN1050);157 (UN1789)
Other information	:	No supplementary information available.
Special transport precautions	:	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG)	:	1050
Proper Shipping Name (IMDG)	:	HYDROGEN CHLORIDE, ANHYDROUS
Class (IMDG)	:	2 - Gases
MFAG-No	:	125

Air transport

UN-No. (IATA)	:	1050
Proper Shipping Name (IATA)	:	Hydrogen chloride, anhydrous
Class (IATA)	:	2
Civil Aeronautics Law	:	Gases under pressure/Gases toxic under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen chloride (7647-01-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on the United States SARA Section 302 Subject to reporting requirements of United States SARA Section 313	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA
CERCLA RQ	5000 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	500 lb (gas only)
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Immediate (acute) health hazard Sudden release of pressure hazard
SARA Section 313 - Emission Reporting	1.0 % (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

15.2. International regulations

CANADA

Hydrogen chloride (7647-01-0)
Listed on the Canadian DSL (Domestic Substances List)

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EU-Regulations

Hydrogen chloride (7647-01-0)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Hydrogen chloride (7647-01-0)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Japanese Poisonous and Deleterious Substances Control Law Listed on the Canadian IDL (Ingredient Disclosure List) Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on CICR (Turkish Inventory and Control of Chemicals)

15.3. US State regulations

Hydrogen chloride(7647-01-0)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : When you mix two or more chemicals, you can 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 evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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

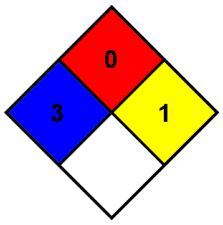
The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's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

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NFPA health hazard	: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	: 0 - Materials that will not burn.
NFPA reactivity	: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 0 Minimal Hazard
Physical	: 3 Serious Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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SAFETY DATA SHEET

Issuing Date 03-Mar-2014 **Revision Date** 31-Jan-2018 **Revision Number** 6

The supplier identified below generated this SDS using the UL SDS template. UL did not test, certify, or approve the substance described in this SDS, and all information in this SDS was provided by the supplier or was reproduced from publically available regulatory data sources. UL makes no representations or warranties regarding the completeness or accuracy of the information in this SDS and disclaims all liability in connection with the use of this information or the substance described in this SDS. The layout, appearance and format of this SDS is © 2014 UL LLC. All rights reserved.

1. IDENTIFICATION

Product identifier

Product Name Jet-Lube® KOPR-KOTE® - Aerosol

Other means of identification

Product Code(s) 10041

Synonyms KOPR-KOTE® - Aerosol

Recommended use of the chemical and restrictions on use

Recommended Use Lubricants, Greases and Release Products

Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier Identification Jet-Lube of Canada Ltd.

Address Jet-Lube of Canada Ltd.
3820 - 97 Street NW
Edmonton, AB. Canada
T6E-5S8

Telephone JLC Office 1.780.463.7441 Toll Free 1.888.771.7775

E-mail Sales@jetlubecanada.com

Emergency telephone number

Company Emergency Phone Number Toll Free: 1-888-771-7775

Emergency Telephone Number CHEMTREC: +1-703-527-3887 (INTERNATIONAL)
1-800-424-9300 (NORTH AMERICA)

2. HAZARDS IDENTIFICATION

Classification

Serious eye damage/eye irritation	Category 2A
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 1

Flammable Aerosols	Category 1
Gases Under Pressure	Liquefied Gas

Appearance Copper Bronze **Physical state** Aerosol **Odor** Petroleum

GHS Label elements, including precautionary statements

Danger

Hazard statements
Causes serious eye irritation
May cause drowsiness or dizziness
Causes damage to organs through prolonged or repeated exposure
Extremely flammable aerosol
Contains gas under pressure; may explode if heated



Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Do not spray on an open flame or other ignition source
Pressurized container: Do not pierce or burn, even after use
Precautionary Statements - Response
IF exposed or concerned: 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
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell

Precautionary Statements - Storage
Store locked up
Protect from sunlight. Store in a well-ventilated place
Do not expose to temperatures exceeding 50 °C/122 °F

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Other information
May be harmful if swallowed Causes mild skin irritation Very toxic to aquatic life with long lasting effects

Unknown acute toxicity 100 % of the mixture consists of ingredient(s) of unknown toxicity

50.1 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
100 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable.

Mixture

Synonyms KOPR-KOTE® - Aerosol

Chemical name	CAS-No	Percent	Hazardous Material Information Review Act registry number (HMIRA registry #)	Date HMIRA filed and date exemption granted (if applicable)
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc.	74869-21-9	45-50	-	-
Propane	74-98-6	25-30	-	-
Graphite	7782-42-5	5-10	-	-
Copper (flake)	7440-50-8	5-10	-	-
Solvent naphtha (petroleum), medium aliphatic	64742-88-7	1-5	-	-
Talc	14807-96-6	1-5	-	-
Limestone	1317-65-3	1-5	-	-
Molybdenum (IV) sulfide	1317-33-5	1-5	-	-

4. FIRST AID MEASURES

First aid measures

General advice Show this safety data sheet to the doctor in attendance. IF exposed or concerned: Get medical advice/attention.

Inhalation Remove to fresh air.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Remove contact lenses, if present and easy to do. Continue rinsing.

Skin contact In case of contact with liquefied gas, thaw frosted parts with lukewarm water.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Self-protection of the first aider Remove all sources of ignition. Ensure that medical personnel are aware of the material(s)

involved, take precautions to protect themselves and prevent spread of contamination. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Symptoms No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Dry chemical. Carbon dioxide (CO2). Water spray.

Unsuitable extinguishing media DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

Specific hazards arising from the chemical Risk of ignition. Keep product and empty container away from heat and sources of ignition. In the event of fire, cool tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists. Containers may explode when heated. Ruptured cylinders may rocket.

Hazardous Combustion Products Carbon oxides.

Explosion Data
Sensitivity to Mechanical Impact Yes.
Sensitivity to Static Discharge Yes.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Evacuate personnel to safe areas. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Take precautionary measures against static discharges. Contents under pressure. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture of weld containers.

Other Information Ventilate the area. Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. A vapor suppressing foam may be used to reduce vapors. Dike far ahead of spill to collect runoff water. Keep out of drains, sewers, ditches and waterways. Flood with water to complete polymerization and scrape off floor.

Methods for cleaning up Take precautionary measures against static discharges. Dam up. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Use personal protection equipment. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not spray on an open flame or other ignition source. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Use spark-proof tools and explosion-proof equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Keep in an area equipped with sprinklers. Do not puncture or incinerate cans. Contents under pressure. In case of rupture. Avoid breathing vapors or mists. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture of weld containers. Avoid contact with skin, eyes or clothing.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep in properly labeled containers. Do not store near combustible materials. Keep in an area equipped with sprinklers. Store in accordance with the particular national regulations. Store in accordance with local regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Propane 74-98-6	TWA: 1000 ppm	TWA: 1000 ppm TWA: 1800 mg/m³	IDLH: 2100 ppm TWA: 1000 ppm TWA: 1800 mg/m³
Graphite 7782-42-5	TWA: 2 mg/m³ respirable particulate matter all forms except graphite fibers	TWA: 15 mg/m³ total dust synthetic TWA: 5 mg/m³ respirable fraction synthetic (vacated) TWA: 2.5 mg/m³ respirable dust natural (vacated) TWA: 10 mg/m³ total dust synthetic (vacated) TWA: 5 mg/m³ respirable fraction synthetic TWA: 15 mppcf natural	IDLH: 1250 mg/m³ TWA: 2.5 mg/m³ respirable dust
Copper (flake) 7440-50-8	TWA: 0.2 mg/m³ fume TWA: 1 mg/m³ Cu dust and mist	TWA: 0.1 mg/m³ fume TWA: 1 mg/m³ dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³ dust, fume and mist IDLH: 100 mg/m³ Cu dust and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume TWA: 1 mg/m³ Cu dust and mist
Talc 14807-96-6	TWA: 2 mg/m³	(vacated) TWA: 2 mg/m³	IDLH: 1000 mg/m³ containg no asbestos and <1% quartz TWA: 2 mg/m³
Limestone	-	TWA: 15 mg/m³	TWA: 5 mg/m³ respirable dust

1317-65-3		TWA: 5 mg/m³ (vacated) TWA: 15 mg/m³ (vacated) TWA: 5 mg/m³	TWA: 10 mg/m³ total dust
Molybdenum (IV) sulfide 1317-33-5	TWA: 10 mg/m³ Mo inhalable particulate matter TWA: 3 mg/m³ Mo respirable particulate matter	TWA: 15 mg/m³ total dust (vacated) TWA: 10 mg/m³ Mo	IDLH: 5000 mg/m³ Mo

Chemical name	Alberta	British Columbia	Ontario TWAEV	Quebec
Propane 74-98-6	TWA: 1000 ppm	TWA: 1000 ppm	TWA: 1000 ppm	TWA: 1000 ppm TWA: 1800 mg/m³
Graphite 7782-42-5	TWA: 2 mg/m³	TWA: 2 mg/m³	TWA: 2 mg/m³	TWA: 2 mg/m³
Copper (flake) 7440-50-8	TWA: 0.2 mg/m³ TWA: 1 mg/m³	TWA: 1 mg/m³ TWA: 0.2 mg/m³	TWA: 0.2 mg/m³ TWA: 1 mg/m³	TWA: 0.2 mg/m³ TWA: 1 mg/m³
Talc 14807-96-6	TWA: 2 mg/m³	TWA: 2 mg/m³	TWA: 2 mg/m³	TWA: 3 mg/m³
Limestone 1317-65-3	TWA: 10 mg/m³	TWA: 10 mg/m³ TWA: 3 mg/m³ STEL: 20 mg/m³		TWA: 10 mg/m³
Molybdenum (IV) sulfide 1317-33-5	TWA: 10 mg/m³ TWA: 3 mg/m³	TWA: 3 mg/m³ TWA: 10 mg/m³	TWA: 10 mg/m³ TWA: 3 mg/m³	TWA: 10 mg/m³

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992). See section 15 for national exposure control parameters.

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Tight sealing safety goggles.

Hand protection Impervious gloves. Wear suitable gloves.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron. Antistatic boots.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical state Aerosol
Appearance Copper Bronze
Odor Petroleum
Color No information available
Odor Threshold No data available

Property	Values	Remarks Method
pH	7	

Melting / freezing point	260 °C	None known
Boiling point / boiling range	316 °C	None known
Flash Point	> 75 °C	None known
Evaporation Rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		None known
Upper flammability limit	No data available	
Lower flammability limit	No data available	
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Relative density	0.881	
Water Solubility	Insoluble in water	
Solubility(ies)	No data available	None known
Partition coefficient: n-octanol/water	Not Applicable	
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content (%)	No information available
264	
Liquid Density	No information available
Bulk Density	No information available
Particle Size	No information available
Particle Size Distribution	No information available

10. STABILITY AND REACTIVITY

Reactivity No information available.

Chemical stability Stable under normal conditions.

Possibility of Hazardous Reactions None under normal processing.

Hazardous Polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat, flames and sparks. Excessive heat.

Incompatible materials None known based on information supplied.

Hazardous Decomposition Products Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal. May cause drowsiness or dizziness.

Eye contact Causes serious eye irritation.

Skin contact Specific test data for the substance or mixture is not available.

Ingestion Specific test data for the substance or mixture is not available.

Information on toxicological effects

Symptoms No information available.

Numerical measures of toxicity

Acute Toxicity

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 2,280.00 mg/kg

Unknown acute toxicity 100 % of the mixture consists of ingredient(s) of unknown toxicity
50.1 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
100 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc.	= 2280 mg/kg (Rat)	-	-
Propane	-	-	= 658 mg/L (Rat) 4 h
Solvent naphtha (petroleum), medium aliphatic	> 25 mL/kg (Rat)	> 3000 mg/kg (Rabbit)	> 13 mg/L (Rat) 4 h
Molybdenum (IV) sulfide	-	-	> 2820 mg/m³ (Rat) 4 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation No information available.

Serious eye damage/eye irritation No information available.

Respiratory or skin sensitization No information available.

Germ cell mutagenicity No information available.

Carcinogenicity Based on available data, the classification criteria are not met.

The table below indicates whether each agency has listed any ingredient as a carcinogen.
Legend

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard No information available.

12. ECOLOGICAL INFORMATION

Marine Pollutant This product contains a chemical which is listed as a severe marine pollutant according to DOT

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Chemical name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Lubricating greases A complex combination of hydrocarbons having carbon numbers predominantly in the range of C12 through C50. may contain organic salts of alkali metals, alkaline earth metals, etc.	>1001 mg/l	96h LC50: > 2000 mg/L (Salmo gairdneri)	-	-
Copper (flake)	96h EC50: 0.031 - 0.054 mg/L (Pseudokirchneriella subcapitata) 72h EC50: 0.0426 - 0.0535 mg/L (Pseudokirchneriella subcapitata)	96h LC50: 0.0068 - 0.0156 mg/L (Pimephales promelas) 96h LC50: = 1.25 mg/L (Lepomis macrochirus) 96h LC50: = 0.052 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.2 mg/L (Pimephales promelas) 96h LC50: < 0.3 mg/L (Pimephales promelas) 96h LC50: = 0.112 mg/L (Poecilia reticulata) 96h LC50: = 0.3 mg/L (Cyprinus carpio) 96h LC50: = 0.8 mg/L (Cyprinus carpio)	-	48h EC50: = 0.03 mg/L
Solvent naphtha (petroleum), medium aliphatic	96h EC50: = 450 mg/L (Pseudokirchneriella subcapitata)	96h LC50: = 800 mg/L (Pimephales promelas)	-	48h EC50: > 100 mg/L
Talc	-	96h LC50: > 100 g/L (Brachydanio rerio)	-	-

Persistence and Degradability No information available.

Bioaccumulation

Chemical name	Log Pow
Propane	2.3

Mobility No information available.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products	Should not be released into the environment. Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.
US EPA Waste Number	D001

California Hazardous Waste Codes 331

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical name	California Hazardous Waste
Copper (flake) 7440-50-8	Toxic

14. TRANSPORT INFORMATION

DOT

UN-No.	UN1950
Proper Shipping Name	Aerosols, flammable
Hazard Class	2.1
Marine Pollutant	This product contains a chemical which is listed as a severe marine pollutant according to DOT
Description	UN1950, Aerosols, flammable, 2.1
Emergency Response Guide Number	126

TDG

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.1
Packing Group	None
Marine Pollutant	This product contains a chemical which is listed as a severe marine pollutant according to TDG.
Description	UN1950, Aerosols, 2.1

MEX

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.2
Description	UN1950, Aerosols, 2.2

ICAO

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.1
Description	UN1950, Aerosols, 2.1

IATA

UN-No.	UN1950
Proper Shipping Name	Aerosols, flammable
Hazard Class	2.1
Packing Group	None
ERG Code	10L

Description	UN1950, Aerosols, flammable, 2.1

IMDG/IMO

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.1
Packing Group	None
EmS-No.	F-D, S-U
Description	UN1950, Aerosols, 2.1, FP >75C

RID

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.1
Classification code	5F
Description	UN1950 Aerosols, 2.1,
ADR/RID-Labels	2.1

ADR

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2.1
Classification code	5F
Tunnel restriction code	(D)
Description	UN1950 Aerosols, 2.1,

ADN

UN-No.	UN1950
Proper Shipping Name	Aerosols
Hazard Class	2
Classification code	5F
Special Provisions	190, 327, 344, 625
Description	UN1950, Aerosols, 2.1
Hazard Labels	2.1
Limited Quantity	1 L
Ventilation	VE01, VE04

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

Ozone-depleting substances (ODS) Not applicable

Persistent Organic Pollutants Not applicable

Export Notification requirements Not applicable

International Inventories

TSCA	Contact supplier for inventory compliance status.
DSL/NDSL	Contact supplier for inventory compliance status.
EINECS/ELINCS	Contact supplier for inventory compliance status.
ENCS	Contact supplier for inventory compliance status.
KECL	Contact supplier for inventory compliance status.
PICCS	Contact supplier for inventory compliance status.
AICS	Contact supplier for inventory compliance status.

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	CAS-No	Percent	SARA 313 - Threshold Values %
Copper (flake) - 7440-50-8	7440-50-8	5-10	1.0

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden release of pressure hazard	Yes
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Copper (flake) 7440-50-8		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Copper (flake) 7440-50-8	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

.

Chemical name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Propane 74-98-6	X	X	X	X	-
Graphite 7782-42-5	X	X	X	X	
Copper (flake) 7440-50-8	X	X	X	X	X
Talc	X	X	X	X	X

14807-96-6					
Limestone 1317-65-3	X	X	X	X	
Molybdenum (IV) sulfide 1317-33-5		X			

16. OTHER INFORMATION

NFPA	**Health hazards** 2	**Flammability** 4	**Instability** 0	**Physical and Chemical Properties** -
HMIS	**Health hazards** 2*	**Flammability** 4	**Physical hazards** 0	**Personal Protection** X

Chronic Hazard Star Legend * = *Chronic Health Hazard*

Prepared By

Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 03-Mar-2014

Revision Date 31-Jan-2018

Revision Note No information available

Disclaimer

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

End of Safety Data Sheet

SAFETY DATA SHEET

Revision Date: *03-Jan-2017* **Revision Number:** *1*

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	**INSL-X LATEX FIRE RETARDANT PAINT WHITE**
Product Code	**FR-110**
Alternate Product Code	TC5901
Product Class	WATER THINNED PAINT
Color	White
Recommended use	Paint
Restrictions on use	No information available

Manufacturer
Benjamin Moore & Co.
101 Paragon Drive
Montvale, NJ 07645
Phone: 800-225-5554
insl-x.com

Emergency Telephone Number(s)
CHEMTREC (US): 800-424-9300
CHEMTREC (outside US): (703)-527-3887

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Reproductive toxicity	Category 2

Label elements

Warning

Hazard statements
Suspected of damaging fertility or the unborn child



Appearance liquid **Odor** little or no odor

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required

Precautionary Statements - Response
If exposed or concerned get medical attention

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not Applicable

Other information
No information available

3. COMPOSITION INFORMATION ON COMPONENTS

Chemical Name	CAS-No	Weight % (max)
Titanium dioxide	13463-67-7	10
Distillates, petroleum, solvent-refined heavy paraffinic	64741-88-4	1

4. FIRST AID MEASURES

General Advice No hazards which require special first aid measures.

Eye Contact Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Skin Contact Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.

Inhalation Move to fresh air. If symptoms persist, call a physician.

Ingestion Clean mouth with water and afterwards drink plenty of water. Consult a physician if necessary.

Most Important Symptoms/Effects None known.

Notes To Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

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.

Specific Hazards Arising From The Chemical	Closed containers may rupture if exposed to fire or extreme heat.
Sensitivity To Mechanical Impact	No
Sensitivity To Static Discharge	No

Flash Point Data

Flash Point (°F)	Not applicable
Flash Point (°C)	Not applicable
Flash Point Method	Not applicable

Flammability Limits In Air

Lower Explosion Limit	Not applicable
Upper Explosion Limit	Not applicable

NFPA **Health:** 1 **Flammability:** 0 **Instability:** 0 **Special:** Not Applicable

NFPA Legend
0 - Not Hazardous
1 - Slightly
2 - Moderate
3 - High
4 - Severe

The ratings assigned are only suggested ratings, the contractor/employer has ultimate responsibilities for NFPA ratings where this system is used.

Additional information regarding the NFPA rating system is available from the National Fire Protection Agency (NFPA) at www.nfpa.org.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.
Other Information	Prevent further leakage or spillage if safe to do so.
Environmental Precautions	See Section 12 for additional Ecological Information.
Methods For Clean-Up	Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Handling	Avoid contact with skin, eyes and clothing. Avoid breathing vapors, spray mists or sanding dust. In case of insufficient ventilation, wear suitable respiratory equipment.
Storage	Keep container tightly closed. Keep out of the reach of children.
Incompatible Materials	No information available

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

Chemical Name	ACGIH	OSHA
Titanium dioxide	10 mg/m³ - TWA	15 mg/m³ - TWA

Legend
ACGIH - American Conference of Governmental Industrial Hygienists Exposure Limits
OSHA - Occupational Safety & Health Administration Exposure Limits
N/E - Not Established

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.
Skin Protection Protective gloves and impervious clothing.
Respiratory Protection In case of insufficient ventilation wear suitable respiratory equipment.

Hygiene Measures Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid
Odor	little or no odor
Odor Threshold	No information available
Density (lbs/gal)	10.75 - 10.85
Specific Gravity	1.29 - 1.31
pH	No information available
Viscosity (cps)	No information available
Solubility	No information available
Water Solubility	No information available
Evaporation Rate	No information available
Vapor Pressure	No information available
Vapor Density	No information available
Wt. % Solids	55 - 65
Vol. % Solids	40 - 50
Wt. % Volatiles	35 - 45
Vol. % Volatiles	50 - 60
VOC Regulatory Limit (g/L)	<50
Boiling Point (°F)	212
Boiling Point (°C)	100
Freezing Point (°F)	32
Freezing Point (°C)	0
Flash Point (°F)	Not applicable
Flash Point (°C)	Not applicable
Flash Point Method	Not applicable
Flammability (solid, gas)	Not applicable
Upper Explosion Limit	Not applicable
Lower Explosion Limit	Not applicable
Autoignition Temperature (°F)	No information available
Autoignition Temperature (°C)	No information available
Decomposition Temperature (°F)	No information available
Decomposition Temperature (°C)	No information available
Partition Coefficient (n-octanol/water)	No information available

10. STABILITY AND REACTIVITY

Reactivity	Not Applicable
Chemical Stability	Stable under normal conditions.
Conditions To Avoid	Prevent from freezing.
Incompatible Materials	No materials to be especially mentioned.
Hazardous Decomposition Products	None under normal use.
Possibility Of Hazardous Reactions	None under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Product Information

Information on likely routes of exposure

Principal Routes of Exposure Eye contact, skin contact and inhalation.

Acute Toxicity

Product Information No information available

Information on toxicological effects

Symptoms No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Eye contact	May cause slight irritation.
Skin contact	Substance may cause slight skin irritation. Prolonged or repeated contact may dry skin and cause irritation.
Inhalation	May cause irritation of respiratory tract.
Ingestion	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Sensitization:	No information available
Neurological Effects	No information available.
Mutagenic Effects	No information available.
Reproductive Effects	Possible risk of impaired fertility. Possible risk of harm to the unborn child.
Developmental Effects	No information available.
Target Organ Effects	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Other adverse effects	No information available.
Aspiration Hazard	No information available

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral) 12353 mg/kg

ATEmix (dermal) 13400 mg/kg

Component

Titanium dioxide
LD50 Oral: > 10000 mg/kg (Rat)
Distillates, petroleum, solvent-refined heavy paraffinic
LD50 Oral: > mg/kg (Rat)
LD50 Dermal: > mg/kg
LC50 Inhalation (Vapor): > mg/L (Rat, 4 hr.)

Carcinogenicity
The information below indicates whether each agency has listed any ingredient as a carcinogen:.

Chemical Name	IARC	NTP	OSHA Carcinogen
Titanium dioxide	2B - Possible Human Carcinogen		Listed

• Although IARC has classified titanium dioxide as possibly carcinogenic to humans (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other materials, such as paint."

Legend
IARC - International Agency for Research on Cancer
NTP - National Toxicity Program
OSHA - Occupational Safety & Health Administration

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects
The environmental impact of this product has not been fully investigated.

Product Information

Acute Toxicity to Fish
No information available

Acute Toxicity to Aquatic Invertebrates
No information available

Acute Toxicity to Aquatic Plants
No information available

Persistence / Degradability
No information available.

Bioaccumulation / Accumulation
No information available.

Mobility in Environmental Media
No information available.

Ozone
No information available

Component

Acute Toxicity to Fish

Titanium dioxide
LC50: > 1000 mg/L (Fathead Minnow - 96 hr.)

Acute Toxicity to Aquatic Invertebrates
No information available

Acute Toxicity to Aquatic Plants
No information available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method Dispose of in accordance with federal, state, and local regulations. Local requirements may vary, consult your sanitation department or state-designated environmental protection agency for more disposal options.

14. TRANSPORT INFORMATION

DOT Not regulated

ICAO / IATA Not regulated

IMDG / IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA: United States Yes - All components are listed or exempt.
DSL: Canada Yes - All components are listed or exempt.

Federal Regulations

SARA 311/312 hazardous categorization

Acute Health Hazard	No
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

None

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product contains the following HAPs:

None

State Regulations

California Proposition 65

This product may contain small amounts of materials known to the state of California to cause cancer or reproductive harm.

State Right-to-Know

Chemical Name	Massachusetts	New Jersey	Pennsylvania
Titanium dioxide	X	X	X

Legend
X - Listed

16. OTHER INFORMATION

HMIS - **Health:** 1* **Flammability:** 0 **Reactivity:** 0 **PPE:** -

HMIS Legend
0 - Minimal Hazard
1 - Slight Hazard
2 - Moderate Hazard
3 - Serious Hazard
4 - Severe Hazard
* - Chronic Hazard
X - Consult your supervisor or S.O.P. for "Special" handling instructions.
Note: The PPE rating has intentionally been left blank. Choose appropriate PPE that will protect employees from the hazards the material will present under the actual normal conditions of use.

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, has chosen to provide them. HMIS® ratings are to be used only in conjunction with a fully implemented HMIS® program by workers who have received appropriate HMIS® training. HMIS® is a registered trade and service mark of the NPCA. HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

WARNING! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

Prepared By
Product Stewardship Department
Benjamin Moore & Co.
101 Paragon Drive
Montvale, NJ 07645
855-724-6802

Revision Date: 03-Jan-2017

Revision Summary Not available

Disclaimer

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, provincial, and local laws and regulations.

END OF SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

LVS Wet Chemical Agent

Product Code: 1030-2-007 ANa Issue Date: 01-08-2014

1. Product and Company Identification

Material name	**LVS Wet Chemical Agent**
Version #	02
Revision date	01-08-2014
CAS #	Mixture
Product Code	1030-2-007 ANa
Product use	Fire extinguishing agent
Manufacturer / Importer / Supplier	
Name	Tyco Fire Protection Products
Address	One Stanton Street Marinette, WI 54143-2542
Phone	715-735-7411
Internet	http://www.ansul.com
Emergency Phone Number	CHEMTREC 800-424-9300 or 703-527-3887

2. Hazards Identification

Emergency overview	WARNING! Causes skin and eye irritation. Keep out of reach of children. Prolonged exposure may cause chronic effects.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Skin contact. Eye contact. Inhalation.
Eyes	Do not get this material in contact with eyes.
Skin	Avoid contact with the skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Inhalation	Vapors may irritate mucous membranes. Do not breathe vapor.
Ingestion	Not a likely route of entry. Do not ingest.
Target organs	Eyes. RESPIRATORY SYSTEM. Skin. Central nervous system.
Chronic effects	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Signs and symptoms	Irritation of nose and throat. Irritation of eyes and mucous membranes. Defatting of the skin. Rash. Skin irritation.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Butyl Carbitol	112-34-5	1 - 2.5
ETHYLENE GLYCOL	107-21-1	10 - 20
Other components below reportable levels		80 - 90

4. First Aid Measures

First aid procedures	
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation persists after washing.
Skin contact	Wash off with warm water and soap. Get medical attention if irritation develops and persists.
Inhalation	Move to fresh air. Get medical attention, if needed.
Ingestion	Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Notes to physician	Symptoms may be delayed.

General advice If you feel unwell, seek medical advice (show the label where possible). 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

Flammable properties No unusual fire or explosion hazards noted.

Extinguishing media

Suitable extinguishing media This product is not flammable. Use extinguishing agent suitable for type of surrounding fire.

Protection of firefighters

Specific hazards arising from the chemical None known.

Hazardous combustion products May include oxides of nitrogen.

6. Accidental Release Measures

Personal precautions Local authorities should be advised if significant spillages cannot be contained. Surfaces may become slippery after spillage.

Environmental precautions Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

Methods for containment Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up Should not be released into the environment.

Large Spills: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece).

Never return spills in original containers for re-use. Following product recovery, flush area with water. Clean surface thoroughly to remove residual contamination.

7. Handling and Storage

Handling Do not get this material in contact with eyes. Avoid contact with skin. Avoid prolonged exposure. Handle and open container with care.

Storage Store in cool place. Store in a well-ventilated place. Keep container tightly closed. Keep out of the reach of children. Use care in handling/storage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	Type	Value	Form
ETHYLENE GLYCOL (107-21-1)	TWA	100.0000 mg/m3	Aerosol.

U.S. - OSHA

Components	Type	Value
ETHYLENE GLYCOL (107-21-1)	Ceiling	50.0000 ppm 125.0000 mg/m3

Personal protective equipment

Eye / face protection Do not get in eyes. Wear approved chemical safety glasses or goggles where eye exposure is reasonably probable.

Skin protection Wear appropriate chemical resistant clothing. Chemical resistant gloves.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygiene considerations When using do not smoke. Avoid contact with skin. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance	
Form	Liquid.
Color	Clear. Colorless.
Odor	Slight. Vinegar-like.
Physical state	Liquid.
pH	10 - 12
Melting point	Not available.
Freezing point	Not available.
Boiling point	244.4 °F (118 °C)
Flash point	Not available.
Evaporation rate	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Specific gravity	1.2
Relative density	Not available.
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
VOC	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	None known.
Incompatible materials	Strong oxidizing agents. Oxidizing agents. Peroxides. Acids.
Hazardous decomposition products	Nitrogen oxides (NOx). Sulfur oxides. Carbon oxides.

11. Toxicological Information

Toxicological data

Components	Test Results
ETHYLENE GLYCOL (107-21-1)	Acute Dermal LD50 Rabbit: 9530 mg/kg
	Acute Oral LD50 Dog: > 8810 mg/kg
	Acute Oral LD50 Guinea pig: 8200 mg/kg
	Acute Oral LD50 Mouse: 14600 mg/kg
	Acute Oral LD50 Rat: 6140 mg/kg
	Acute Other LD50 Mouse: 5.8 g/kg
	Acute Other LD50 Rat: 2800 mg/kg
Butyl Carbitol (112-34-5)	Acute Dermal LD50 Rabbit: 2700 mg/kg
	Acute Oral LD50 Guinea pig: 2000 mg/kg
	Acute Oral LD50 Rabbit: 2200 mg/kg
	Acute Oral LD50 Rat: 6560 mg/kg
	Acute Other LD50 Mouse: 850 mg/kg
	Acute Other LD50 Rat: 500 mg/kg

Local effects Components of the product may be absorbed into the body through the skin. Contact may irritate or burn eyes.

Chronic effects Hazardous by OSHA criteria.

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

ACGIH Carcinogens

ETHYLENE GLYCOL (CAS 107-21-1)	A4 Not classifiable as a human carcinogen.

Further information Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

Components	Test Results
ETHYLENE GLYCOL (107-21-1)	LC50 Fathead minnow (Pimephales promelas): 8050 mg/l 96.00 hours
Butyl Carbitol (112-34-5)	EC50 Algae: > 100 mg/l 96.00 Hours
	EC50 Water flea (Daphnia magna): 3184 mg/l 24.00 hours
	LC50 Bluegill (Lepomis macrochirus): 1300 mg/l 96.00 hours

* Estimates for product may be based on additional component data not shown.

Ecotoxicity Contains a substance which causes risk of hazardous effects to the environment.

Environmental effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability Not available.

13. Disposal Considerations

Disposal instructions This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

Waste from residues / unused products Dispose of in accordance with local regulations.

14. Transport Information

DOT

Not regulated as dangerous goods.

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.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Butyl Carbitol (CAS 112-34-5)	1.0 % N230
ETHYLENE GLYCOL (CAS 107-21-1)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Butyl Carbitol (CAS 112-34-5)	Listed. N230
ETHYLENE GLYCOL (CAS 107-21-1)	Listed.

CERCLA (Superfund) reportable quantity

ETHYLENE GLYCOL: 5000.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Acute Health - Yes
Chronic Health - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance No

Section 311 hazardous chemical No

Inventory status

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)	No
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)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
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)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

Butyl Carbitol (CAS 112-34-5)	500 LBS
ETHYLENE GLYCOL (CAS 107-21-1)	500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance

Butyl Carbitol (CAS 112-34-5)	Listed.
ETHYLENE GLYCOL (CAS 107-21-1)	Listed.

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings
Health: 2
Flammability: 0
Physical hazard: 0

NFPA ratings
Health: 2
Flammability: 0
Instability: 0

Issue date 01-08-2014

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: MOBIL DELVAC 1 ESP 0W-40
Product Description: Synthetic Base Stocks and Additives
SDS Number: 20545
Product Code: 201520101016
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Downstream**
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be NON-HAZARDOUS according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

HEALTH HAZARDS

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

ENVIRONMENTAL HAZARDS

No significant hazards.

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

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

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	GHS Hazard Codes
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	20 - < 30%	H304
BENZENAMINE, AR-NONYL-N-(NONYL PHENYL)-	36878-20-3	1 - < 5%	H413
BENZENE PROPANOIC ACID, 3,5-BIS(1,1-DIMETHYLETHYL)-4-HYDROXY-,C7-9 BRANCHED ALKYL ESTERS	125643-61-0	1 - < 5%	H413
BENZENESULFONIC ACID, MONO-C16-24-ALKYL DERIVS. CALCIUM SALTS	70024-69-0	0.1 - < 1%	H317
DIPHENYLAMINE	122-39-4	0.1 - < 0.25%	H301, H311, H331, H373, H400(M factor 1), H410(M factor 1)
SEVERELY HYDROTREATED HEAVY PARAFFINIC DISTILLATE	64742-54-7	1 - < 5%	H304
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	5 - < 10%	H304
TETRAPROPENYL PHENOL	121158-58-5	0.1 - < 0.25%	H314(1A), H360(1B)(F), H400(M factor 10), H410(M factor 10)

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST-AID MEASURES

INHALATION

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

SKIN CONTACT

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

EYE CONTACT

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

INGESTION

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

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

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

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

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

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

FLAMMABILITY PROPERTIES

Flash Point [Method]: 240°C (464°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

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

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

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

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

before using dispersants.

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

ENVIRONMENTAL PRECAUTIONS

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

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with used product. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The type of container used to store the material may affect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m3			Supplier
DIPHENYLAMINE		TWA	10 mg/m3			ACGIH
SEVERELY HYDROTREATED HEAVY PARAFFINIC DISTILLATE	Mist.	TWA	5 mg/m3			ACGIH
SOLVENT DEWAXED HEAVY PARAFFINIC DISTILLATE	Mist.	TWA	5 mg/m3			ACGIH

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following is recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction).

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

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

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

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

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

No protection is ordinarily required under normal conditions of use.

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

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

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

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

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only

and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

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

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.847 [ASTM D4052]
Flammability (Solid, Gas): N/A
Flash Point [Method]: 240°C (464°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: N/D
Decomposition Temperature: N/D
Vapour Density (Air = 1): N/D
Vapour Pressure: < 0.1 kPa (0.75 mm Hg) at 20ºC [Estimated]
Evaporation Rate (n-butyl acetate = 1): < 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]
Solubility in Water: Negligible
Viscosity: 89.9 cSt (89.9 mm2/sec) at 40ºC | 14.6 cSt (14.6 mm2/sec) at 100°C [ASTM D 445]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -45°C (-49°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

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

MATERIALS TO AVOID: Strong oxidizers

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

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: No end point data for	Minimally Toxic. Based on assessment of the components.

material.	
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
Aspiration: Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
Carcinogenicity: No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
Reproductive Toxicity: No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

OTHER INFORMATION

For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components, this formulation, or similar formulations.
Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies. Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitising in test animals and humans. Tetrapropenyl phenol (TPP). TPP was tested in a rat oral gavage one-generation reproductive toxicity study and a rat dietary two-generation reproductive toxicity study. Results from the one-generation study included reduced ovary weights and changes in male reproductive accessory organs. Results from the two-generation study included prolonged estrous cyclicity, reduced ovary weights, accelerated sexual maturation, decreased mean live litter size,

decreased fertility rates, hypospermia, and reduced weights of male reproductive accessory organs. A classification threshold for reproductive effects of 1.5 wt% TPP was derived by the supplier based on the NOAEL (15 mg/kg/day) from the rat dietary two-generation study and was confirmed in supporting studies with other substances containing TPP as an impurity.

CMR Status: None.

--REGULATORY LISTS SEARCHED--

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

SECTION 12 ECOLOGICAL INFORMATION

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

ECOTOXICITY

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

MOBILITY

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

NOTE: One or more components of this material contain an impurity (branched alkylphenol) that is highly toxic to aquatic organisms. The components containing the impurity were tested by the supplier and found to be no more than minimally toxic to aquatic organisms.

SECTION 13 DISPOSAL CONSIDERATIONS

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

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

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

SECTION 14 TRANSPORT INFORMATION

LAND (TDG): Not Regulated for Land Transport

LAND (DOT): Not Regulated for Land Transport

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

Marine Pollutant: No

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Not controlled

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

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, KECI, TSCA

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

--REGULATORY LISTS SEARCHED--

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

SECTION 16 OTHER INFORMATION

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

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H301: Toxic if swallowed; Acute Tox Oral, Cat 3
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H311: Toxic in contact with skin; Acute Tox Dermal, Cat 3
H314(1A): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1A
H317: May cause allergic skin reaction; Skin Sensitization, Cat 1
H331: Toxic if inhaled; Acute Tox Inh, Cat 3
H360(1B)(F): May damage fertility; Repro Tox, Cat 1B (Fertility)
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H413: May cause long lasting harmful effects to aquatic life; Chronic Env Tox, Cat 4

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

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SAFETY DATA SHEET

MOLYKOTE(R) 111 COMPOUND

Version	Revision Date:	SDS Number:	Date of last issue: 11/17/2016
3.2	03/10/2017	1667193-00008	Date of first issue: 03/24/2015

SECTION 1. IDENTIFICATION

Product name : MOLYKOTE(R) 111 COMPOUND

Product code : 000000000001889834

Manufacturer or supplier's details

Company name of supplier : Dow Corning Corporation

Address : South Saginaw Road
Midland Michigan 48686

Telephone : (989) 496-6000

Emergency telephone : 24 Hour Emergency Telephone : (989) 496-5900
CHEMTREC : (800) 424-9300

Recommended use of the chemical and restrictions on use

Recommended use : Lubricants and lubricant additives

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Silicone grease

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Silicon dioxide	7631-86-9	>= 9 - <= 10

SECTION 4. FIRST AID MEASURES

If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : Wash with water and soap as a precaution.
Get medical attention if symptoms occur.

In case of eye contact : Flush eyes with water as a precaution.

Get medical attention if irritation develops and persists.

If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention if symptoms occur. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	None known.
Protection of first-aiders	:	No special precautions are necessary for first aid responders.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Silicon oxides Formaldehyde Boron oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages

cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Handle in accordance with good industrial hygiene and safety practice.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Silicon dioxide	7631-86-9	TWA (Dust)	20 Million particles per cubic foot (Silica)	OSHA Z-3
		TWA (Dust)	80 mg/m3 / %SiO2 (Silica)	OSHA Z-3
		TWA	6 mg/m³ (Silica)	NIOSH REL

These substance(s) are inextricably bound in the product and therefore do not contribute to a dust inhalation hazard.

Silicon dioxide

Engineering measures : Processing may form hazardous compounds (see section 10).
Ensure adequate ventilation, especially in confined areas.
Minimize workplace exposure concentrations.

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

Hand protection

Remarks : Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Safety glasses

Skin and body protection : Skin should be washed after contact.

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.
These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Grease
Color	:	white, translucent
Odor	:	none
Odor Threshold	:	No data available
pH	:	Not applicable
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	Not applicable
Flash point	:	> 101.1 °C Method: closed cup
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	Not classified as a flammability hazard

Self-ignition	:	The substance or mixture is not classified as pyrophoric. The substance or mixture is not classified as self heating.
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	Not applicable
Relative vapor density	:	No data available
Relative density	:	1.1
Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	No data available
Particle size	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Use at elevated temperatures may form highly hazardous compounds. Can react with strong oxidizing agents. Hazardous decomposition products will be formed at elevated temperatures.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents

Hazardous decomposition products

Thermal decomposition : Formaldehyde

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Ingredients:

Silicon dioxide:

Acute oral toxicity : LD50 (Rat): > 3,300 mg/kg
Assessment: The substance or mixture has no acute oral toxicity
Remarks: Information taken from reference works and the literature.

Acute inhalation toxicity : LC50 (Rat): > 2.08 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: Information taken from reference works and the literature.

Acute dermal toxicity : LD50 (Rabbit): > 5,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity
Remarks: Information taken from reference works and the literature.

Skin corrosion/irritation

Not classified based on available information.

Ingredients:

Silicon dioxide:

Result: No skin irritation
Remarks: Information taken from reference works and the literature.

Serious eye damage/eye irritation

Not classified based on available information.

Ingredients:

Silicon dioxide:

Result: No eye irritation
Remarks: Information taken from reference works and the literature.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Ingredients:

Silicon dioxide:

Assessment: Does not cause skin sensitization.

Test Type: Skin: test type not specified
Species: Guinea pig
Result: negative
Remarks: Information taken from reference works and the literature.

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

Silicon dioxide:

Genotoxicity in vitro	:	Result: negative Remarks: Information taken from reference works and the literature.
Genotoxicity in vivo	:	Application Route: Ingestion Result: negative Remarks: Information taken from reference works and the literature.
Germ cell mutagenicity - Assessment	:	Animal testing did not show any mutagenic effects.

Carcinogenicity

Not classified based on available information.

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

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

Resource Conservation and Recovery Act (RCRA)	:	This product has been evaluated for RCRA characteristics and does not meet the criteria of hazardous waste if discarded in its purchased form.
Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

Not regulated as a dangerous good

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.

Domestic regulation

49 CFR

Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Pennsylvania Right To Know

Dimethyl siloxane, trimethylsiloxy-terminated	63148-62-9
Silicon dioxide	7631-86-9
Silicone Metalloid Complex	Trade secret

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

California List of Hazardous Substances

Silicon dioxide	7631-86-9

California Permissible Exposure Limits for Chemical Contaminants

Silicon dioxide	7631-86-9

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

NZIoC : All ingredients listed or exempt.

REACH : For purchases from Dow Corning EU legal entities, all ingredients are currently pre/registered or exempt under REACH. Please refer to section 1 for recommended uses. For purchases from non-EU Dow Corning legal entities with the intention to export into EEA please contact your DC representative/local office.

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

PICCS : All ingredients listed or exempt.

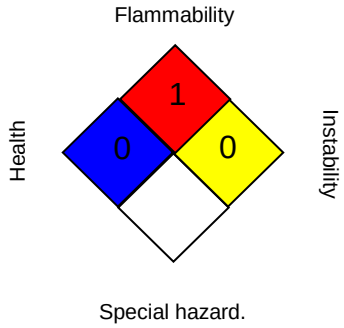
KECI : All ingredients listed, exempt or notified.

AICS	:	All ingredients listed or exempt.
IECSC	:	All ingredients listed or exempt.
ENCS/ISHL	:	All components are listed on ENCS/ISHL or exempted from inventory listing.
DSL	:	This product contains one or more substances which are not on the Canadian Domestic Substances List (DSL). Import of this product into Canada has volume limitations. For volume limits please consult Dow Corning Regulatory Compliance.
TCSI	:	All ingredients listed or exempt.

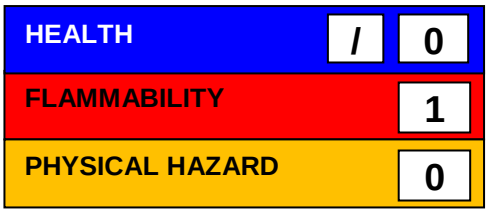
SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-3	:	USA. Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-3 / TWA	:	8-hour time weighted average

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized Sys-

tem; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	03/10/2017

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

US / Z8

Nitrogen

Safety Data Sheet E-4631

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979 Revision date: 08-03-2016 Supersedes: 10-15-2013

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Name	:	Nitrogen
CAS No	:	7727-37-9
Formula	:	N2
Other means of identification	:	Dinitrogen, Refrigerant R728, Nitrogen, Medipure® Nitrogen, Extendapak Nitrogen, Nitrogen - Diving Grade
Product group	:	Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions	:	Medical applications Industrial use Diving Gas (Underwater Breathing)

1.3. Supplier

Praxair Canada inc.
1200 – 1 City Centre Drive
Mississauga - Canada L5B 1M2
T 1-905-803-1600 - F 1-905-803-1682
www.praxair.ca

1.4. Emergency telephone number

Emergency number	:	1-800-363-0042 Call emergency number 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.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Simple asphyxiant	H380
Compressed gas	H280

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



GHS04

Signal word : WARNING

Hazard statements : CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION

Precautionary statements : Do not handle until all safety precautions have been read and understood
Use and store only outdoors or in a well-ventilated area
Protect from sunlight when ambient temperature exceeds 52°C (125°F)
Use a back flow preventive device in the piping
Close valve after each use and when empty
Use only with equipment rated for cylinder pressure
Obtain special instructions before use

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2.3. Other hazards

Other hazards not contributing to the classification : Asphyxiant in high concentrations. May cause suffocation by reducing oxygen available for breathing.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Nitrogen (Main constituent)	(CAS No) 7727-37-9	100	Nitrogen (liquified) / Nitrogen gas / Nitrogen, liquefied / Nitrogen, compressed / NITROGEN

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Immediately remove to fresh air. If not breathing, clear airways of any slurry or caked material and give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product. In case of eye irritation: Rinse immediately with plenty of water. Rinse immediately with plenty of water. Consult an ophthalmologist if irritation persists.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : None.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

Explosion hazard : PRESSURISED CONTAINER: MAY BURST IF HEATED.

Reactivity : Under certain conditions, nitrogen can react violently with lithium, neodymium, titanium (above 1472°F/800°C), or magnesium to form nitrides. At high temperature, it can also combine with oxygen and hydrogen.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with their provincial and local fire code regulations.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

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Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems

Stop flow of product if safe to do so

Use water spray or fog to knock down fire fumes if possible.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Ensure adequate air ventilation. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Stop leak if safe to do so.

6.2. Methods and materials for containment and cleaning up

6.3. Reference to other sections

For further information refer to section 8: Exposure controls/personal protection

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

Safe use of the product : **The suitability of this product as a component in underwater breathing gas mixtures** is to be determined by or under the supervision of personnel experienced in the use of underwater breathing gas mixtures and familiar with the physiological effects, methods employed, frequency and duration of use, hazards, side effects, and precautions to be taken.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls : Use a local exhaust system with sufficient flow velocity to maintain an adequate supply of air in the worker's breathing zone. Mechanical (general): General exhaust ventilation may be acceptable if it can maintain an adequate supply of air.

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8.3. Individual protection measures/Personal protective equipment

Personal protective equipment : In case of splash hazard: safety glasses. Face shield. Gloves.



Hand protection : Wear work gloves when handling containers. Wear heavy rubber gloves where contact with product may occur.

Eye protection : Wear goggles when transfilling or breaking transfer connections. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Skin and body protection : As needed for welding, wear hand, head, and body protection to help prevent injury from radiation and sparks. (See ANSI Z49.1.) At a minimum, this includes welder's gloves and protective goggles, and may include arm protectors, aprons, hats, and shoulder protection as well as substantial clothing.

Respiratory 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 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. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere.

Other information : **Other protection :** Safety shoes for general handling at customer sites. Metatarsal shoes and cuffless trousers for cylinder handling at packaging and filling plants. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines. For working with flammable and oxidizing materials, consider the use of flame resistant anti-static safety clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Colourless gas.
Molecular mass	:	28 g/mol
Colour	:	Colourless.
Odour	:	No odour warning properties.
Odour threshold	:	No data available
pH	:	Not applicable.
pH solution	:	No data available
Relative evaporation rate (butylacetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	-210 °C
Freezing point	:	No data available
Boiling point	:	-195.8 °C
Flash point	:	No data available
Critical temperature	:	-149.9 °C
Auto-ignition temperature	:	Not applicable.
Decomposition temperature	:	No data available
Vapour pressure	:	Not applicable.
Vapour pressure at 50 °C	:	No data available
Critical pressure	:	3390 kPa
Relative vapour density at 20 °C	:	0.00115 (≥ 21.1)
Relative density	:	No data available
Relative density of saturated gas/air mixture	:	No data available
Density	:	1.16 kg/m³
Relative gas density	:	0.97

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Solubility	:	Water: 20 mg/l
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Viscosity, kinematic (calculated value) (40 °C)	:	No data available
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Flammability (solid, gas)	:	Non flammable

9.2. Other information

Gas group	:	Compressed gas
Additional information	:	None

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	:	Under certain conditions, nitrogen can react violently with lithium, neodymium, titanium (above 1472°F/800°C), or magnesium to form nitrides. At high temperature, it can also combine with oxygen and hydrogen.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	May occur.
Conditions to avoid	:	None under recommended storage and handling conditions (see section 7).
Incompatible materials	:	None.
Hazardous decomposition products	:	None.

SECTION 11: Toxicological information

Likely routes of exposure : Inhalation.

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified
Acute toxicity (inhalation)	:	Not classified
Skin corrosion/irritation	:	Not classified pH: Not applicable.
Serious eye damage/irritation	:	Not classified pH: Not applicable.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified

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SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Nitrogen (7727-37-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Nitrogen (7727-37-9)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Nitrogen (7727-37-9)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on the ozone layer : None

Effect on global warming : None

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN1066

TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.

Proper shipping name : NITROGEN, COMPRESSED

Explosive Limit and Limited Quantity Index : 0.125 L

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 75 L

14.3. Air and sea transport

IMDG

UN-No. (IMDG) : 1066

Proper Shipping Name (IMDG) : NITROGEN, COMPRESSED

Class (IMDG) : 2 - Gases

MFAG-No : 121

IATA

UN-No. (IATA) : 1066

Proper Shipping Name (IATA) : Nitrogen, compressed

Class (IATA) : 2

SECTION 15: Regulatory information

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15.1. National regulations

Nitrogen (7727-37-9)
Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Nitrogen (7727-37-9)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on INSQ (Mexican national Inventory of Chemical Substances)

SECTION 16: Other information

Date of issue : 15/10/1979

Revision date : 03/08/2016

Supersedes : 15/10/2013

Indication of changes:

Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.

Other information : Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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

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 Safety Data Sheet. Since the use of this information and the conditions of use 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, SDSs are furnished on sale or delivery by Praxair Canada Inc, or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.ca. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write Praxair Canada Inc, (Phone: 1-888-257-5149; Address: Praxair Canada Inc, 1 City Centre Drive, Suite 1200, Mississauga, Ontario, L5B 1M2).

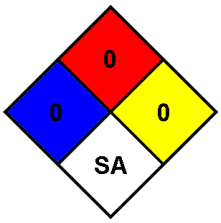
PRAXAIR and the Flowing Airstream design are trademarks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries.

NFPA health hazard : 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.

NFPA specific hazard : SA - This denotes gases which are simple asphyxiants.



HMIS III Rating

Health : 0 Minimal Hazard - No significant risk to health

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 3 Serious Hazard - Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion

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SDS Canada (GHS) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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NAPA Orange 50/50 Prediluted Antifreeze and Coolant

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 03/30/2016

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Product name : NAPA Orange 50/50 Prediluted Antifreeze and Coolant

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Antifreeze & Coolant

1.3. Details of the supplier of the safety data sheet

Old World Industries, LLC
4065 Commercial Ave.
Northbrook, IL 60062 - USA
T (847) 559-2000
www.oldworldind.com

1.4. Emergency telephone number

Emergency number : (800) 424-9300; (703) 527 3887 (International)
Chemtrec

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Acute toxicity (oral), Category 4	H302
Reproductive toxicity, Category 2	H361
Specific target organ toxicity — Repeated exposure, Category 2	H373

Full text of H statements : see section 16

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



GHS07



GHS08

Signal word (GHS-US) : Warning

Hazard statements (GHS-US) :
H302 - Harmful if swallowed
H361 - Suspected of damaging fertility or the unborn child
H373 - May cause damage to organs (kidneys) through prolonged or repeated exposure (oral)

Precautionary statements (GHS-US) :
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P260 - Do not breathe mist, spray, vapors
P264 - Wash affected areas thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P280 - Wear personal protective equipment as required
P301+P310 - If swallowed: Immediately call doctor/physician or poison center
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308+P313 - If exposed or concerned: Get medical advice/attention
P405 - Store locked up
P501 - Dispose of contents/container to appropriate waste disposal facility, in accordance with local/regional/national/international regulations

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	% by wt	GHS-US classification
ethylene glycol	(CAS No) 107-21-1	<= 50	Acute Tox. 4 (Oral), H302
water	(CAS No) 7732-18-5	< 50	Not classified
diethylene glycol	(CAS No) 111-46-6	< 3	Acute Tox. 4 (Oral), H302 STOT RE 2, H373
potassium 2-ethylhexanoate	(CAS No) 3164-85-0	< 2	Repr. 2, H361
denatonium benzoate	(CAS No) 3734-33-6	30 - 50 ppm	Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. IF exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation : If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Remove contaminated clothing. Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Rinse immediately with plenty of water (for at least 15 minutes), Get medical advice/attention.

First-aid measures after eye contact : Remove contact lenses, if present and easy to do. Continue rinsing. Rinse immediately with plenty of water for 15 minutes, lifting lower and upper lids. If eye irritation persists: Get medical advice and attention.

First-aid measures after ingestion : Obtain emergency medical attention. Rinse mouth. If the person is fully conscious, make him/her drink two glasses of water. Never give an unconscious person anything to drink. Do NOT induce vomiting. Call a POISON CENTER/doctor/physician if you feel unwell. If medical advice is delayed, and if the person has swallowed a moderate volume of material (a few ounces), then give three to four ounces of hard liquor, such as whiskey. For children, give proportionally less liquor, according to weight.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Causes damage to organs (kidneys) Oral. Suspected of damaging fertility or the unborn child.

Symptoms/injuries after skin contact : Causes skin irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

Symptoms/injuries after ingestion : Swallowing a small quantity of this material will result in serious health hazard. The lethal dose in humans is estimated to be 100 mL (3 oz).

4.3. Indication of any immediate medical attention and special treatment needed

A more effective intravenous antidote for physician uses is 4-methylpyrazaole, a potent inhibitor of alcohol dehydrogenases, which effectively blocks the formation of toxic metabolites of ethylene glycol. It has been used to decrease the metabolic consequences of ethylene glycol poisoning before metabolic acidosis coma, seizures, and renal failure have occured.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water fog. Fine water spray. Foam. Carbon dioxide. Dry chemical powder. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream. May spread fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Reactivity : No dangerous reactions known under normal conditions of use.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

Special protective equipment for fire fighters : Wear positive pressure self-contained breathing apparatus (SCBA). Protective fire fighting clothing (includes fire-fighting helmet, coat, pants, boots and gloves).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection. Refer to section 8.2.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Small quantities of liquid spill: take up in non-combustible absorbent material and shovel into container for disposal. Store away from other materials.

6.4. Reference to other sections

For further information refer to section 13. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Hygiene measures : Do not eat, drink or smoke when using this product. Wash affected areas thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Heat sources. Keep container closed when not in use. Product may become solid at temperatures below -37 ºC (-34 ºF). Do not store near food, foodstuffs, drugs or potable water supplies. Do not cut, drill, weld, use a blowtorch on, etc. containers even when empty.

Incompatible products : Keep away from strong acids, strong bases and oxidizing agents.

Incompatible materials : Sources of ignition.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

ethylene glycol (107-21-1)		
ACGIH	ACGIH TWA (mg/m³)	10 mg/m³
ACGIH	Remark (ACGIH)	Upper Respiratory Tract (URT) & Eye irritant
OSHA	Not applicable	

8.2. Exposure controls

Personal protective equipment : Avoid all unnecessary exposure. Gloves. Safety glasses.



Hand protection : Wear protective gloves.

Eye protection : Chemical goggles or safety glasses.

Respiratory protection : Respiratory protection not required in normal conditions. If exposed to levels above exposure limits wear appropriate respiratory protection.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Color	: orange
Odor	: Mild
Odor threshold	: No data available
pH	: 8
Relative evaporation rate (butylacetate=1)	: Nil
Freezing point	: -37 °C (-34 ºF)
Boiling point	: 107 °C (224 ºF)
Flash point	: 116 °C (241 ºF) [100% Ethylene Glycol] *ASTM D56*
Auto-ignition temperature	: 400 °C (752 ºF) [100% Ethylene Glycol] *Literature*
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: < 0.1 @ 20 ºC
Relative vapor density at 20 °C	: No data available
Specific Gravity	: 1.06
Density	: 1.06 kg/l (8.84 lbs/gal)
Solubility	: Water: Complete
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not applicable.
Oxidizing properties	: Not applicable.
Explosive limits	: Not applicable

9.2. Other information

VOC content : 0 %

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

Extremely high or low temperatures. Keep away from any flames or sparking source.

10.5. Incompatible materials

Keep away from strong acids, strong bases and oxidizing agents.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide. Fume. alcohols. Aldehydes. Ethers.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed.

denatonium benzoate (3734-33-6)	
LD50 oral rat	584.00 mg/kg (Rat; Literature study)
LD50 dermal rabbit	> 2,000.00 mg/kg (Rabbit; Literature study)

denatonium benzoate (3734-33-6)	
ATE US (oral)	584.00 mg/kg bodyweight

ethylene glycol (107-21-1)	
LD50 oral rat	> 5,000.00 mg/kg (Rat; Literature study)
ATE US (oral)	500.00 mg/kg bodyweight

diethylene glycol (111-46-6)	
LD50 dermal rabbit	11,890.00 mg/kg (Rabbit)
ATE US (oral)	500.00 mg/kg bodyweight
ATE US (dermal)	11,890.00 mg/kg bodyweight

Skin corrosion/irritation : Not classified
pH: 8.00

Serious eye damage/irritation : Not classified
pH: 8.00

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Suspected of damaging fertility or the unborn child.

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : May cause damage to organs (kidneys) through prolonged or repeated exposure (oral).

Aspiration hazard : Not classified

Potential adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

Symptoms/injuries after skin contact : Causes skin irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

Symptoms/injuries after ingestion : Swallowing a small quantity of this material will result in serious health hazard. The lethal dose in humans is estimated to be 100 mL (3 oz).

SECTION 12: Ecological information

12.1. Toxicity

denatonium benzoate (3734-33-6)	
LC50 fish 1	> 1,000.00 mg/l (LC50; 96 h; Salmo gairdneri)
EC50 Daphnia 1	13.00 mg/l (EC50; 48 h; Daphnia magna)

ethylene glycol (107-21-1)	
EC50 Daphnia 1	> 10,000.00 mg/l (EC50; 24 h)
LC50 fish 2	40,761.00 mg/l (LC50; 96 h; Salmo gairdneri)

diethylene glycol (111-46-6)	
LC50 fish 1	> 5,000.00 mg/l (LC50; 24 h)
EC50 Daphnia 1	> 10,000.00 mg/l (EC50; 24 h)

12.2. Persistence and degradability

denatonium benzoate (3734-33-6)	
Persistence and degradability	Biodegradability in water: no data available. No (test) data on mobility of the substance available.

ethylene glycol (107-21-1)	
Persistence and degradability	Readily biodegradable in water. Biodegradable in the soil.
Biochemical oxygen demand (BOD)	0.47 g O_2/g substance

ethylene glycol (107-21-1)	
Chemical oxygen demand (COD)	1.24 g O_2/g substance
ThOD	1.29 g O_2/g substance
BOD (% of ThOD)	0.36

diethylene glycol (111-46-6)	
Persistence and degradability	Readily biodegradable in water. Biodegradable in the soil. Highly mobile in soil. Photolysis in the air.
Biochemical oxygen demand (BOD)	0.02 g O_2/g substance
Chemical oxygen demand (COD)	1.51 g O_2/g substance
ThOD	1.51 g O_2/g substance
BOD (% of ThOD)	0.02

12.3. Bioaccumulative potential

denatonium benzoate (3734-33-6)	
BCF fish 1	1.4 - 3.6 (BCF; BCFBAF v3.00)
Log Pow	1.78 (Estimated value)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

ethylene glycol (107-21-1)	
BCF fish 1	10.00 (BCF; 72 h)
BCF other aquatic organisms 1	0.21 - 0.6 (BCF)
BCF other aquatic organisms 2	190.00 (BCF; 24 h)
Log Pow	-1.34 (Experimental value)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).

diethylene glycol (111-46-6)	
BCF fish 1	100.00 (BCF; Other; 3 days; Leuciscus melanotus; Static system; Fresh water; Experimental value)
Log Pow	-1.98 (Calculated; Other)
Bioaccumulative potential	Low potential for bioaccumulation (BCF < 500).

12.4. Mobility in soil

ethylene glycol (107-21-1)	
Surface tension	0.05 N/m (20 ºC / 68 ºF)

diethylene glycol (111-46-6)	
Surface tension	0.05 N/m
Log Koc	Koc,SRC PCKOCWIN v1.66; 1; Calculated value; log Koc; SRC PCKOCWIN v1.66; 0; Calculated value

12.5. Other adverse effects

Effect on ozone layer : No known effect on the ozone layer

Effect on global warming : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose of contents/container to appropriate waste disposal facility, in accordance with local/regional/national/international regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description	:	UN3082 Environmentally hazardous substances, liquid, n.o.s., 9, III
UN-No.(DOT)	:	UN3082
Proper Shipping Name (DOT)	:	Environmentally hazardous substances, liquid, n.o.s.
Class (DOT)	:	9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140
Packing group (DOT)	:	III - Minor Danger
Hazard labels (DOT)	:	9 - Class 9 (Miscellaneous dangerous materials)



DOT Packaging Non Bulk (49 CFR 173.xxx)	:	203
DOT Packaging Bulk (49 CFR 173.xxx)	:	241
DOT Symbols	:	G - Identifies PSN requiring a technical name
DOT Packaging Exceptions (49 CFR 173.xxx)	:	155
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	No limit
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	No limit
DOT Vessel Stowage Location	:	A - The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel
Other information	:	Non Bulk: Not regulated by the US D.O.T. (in quantities under 5,000 lbs in any one inner package).

TDG

Refer to current TDG Canada for further Canadian regulations

Transport by sea

Proper Shipping Name (IMDG) : Not regulated by IMDG (in quantites under 5,000 lbs in any one inner package)

Air transport

Proper Shipping Name (IATA) : Not regulated by IATA (in quantites under 5,000 lbs in any one inner package)

SECTION 15: Regulatory information

15.1. US Federal regulations

NAPA Orange 50/50 Prediluted Antifreeze and Coolant	
EPA TSCA Regulatory Flag	Toxic Substances Control Act (TSCA): The intentional ingredients of this product are listed

denatonium benzoate (3734-33-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

ethylene glycol (107-21-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA
CERCLA RQ	5000 lb(s)
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Ethylene glycol is subject to Tier I and/or Tier II annual inventory reporting
SARA Section 313 - Emission Reporting	Ethylene glycol is subject to Form R Reporting requirements.

diethylene glycol (111-46-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

potassium 2-ethylhexanoate (3164-85-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

NAPA Orange 50/50 Prediluted Antifreeze and Coolant	
WHMIS Classification	This SDS has been prepared according to the criteria of the Hazardous Products Regulations (HPR) (WHMIS 2015) and the SDS contains all of the information required by the HPR. Applicable GHS information is listed in section 2.2 of this SDS

EU-Regulations

No additional information available

National regulations

NAPA Orange 50/50 Prediluted Antifreeze and Coolant
DSL (Canada): The intentional ingredients of this product are listed ECL (South Korea): The intentional ingredients of this product are listed EINECS (Europe): The intentional ingredients of this product are listed ENCS (Japan): The intentional ingredients of this product are listed

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, substance(s) known to the state of California to cause cancer, developmental toxicity and/or reproductive toxicity

ethylene glycol (107-21-1)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Non-significant risk level (NSRL)
No	Yes	No	No	

ethylene glycol (107-21-1)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

diethylene glycol (111-46-6)
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

SECTION 16: Other information

Revision date : 03/30/2016

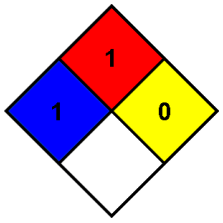
Full text of H-statements:

H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H361	Suspected of damaging fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 1 - Must be preheated before ignition can occur.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating		
Health	:	2 Moderate Hazard - Temporary or minor injury may occur
Flammability	:	1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 ºF (93 ºC). (Class IIIB)
Physical	:	0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.
Personal Protection		B - Safety glasses, Gloves

SDS GHS US (GHS HazCom 2012) OWI

Old World Industries, LLC makes no warranty, representation or guarantee as to the accuracy, sufficiency or completeness of the material set forth herein. It is the user's responsibility to determine the safety, toxicity and suitability of his own use, handling and disposal of this product. Since actual use by others is beyond our control, no warranty, expressed or implied, is made by Old World Industries, LLC as to the effects of such use, the results to be obtained or the safety and toxicity of this product, nor does Old World Industries, LLC assume liability arising out of the use by others of this product referred to herein. The data in this SDS relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Section 1: IDENTIFICATION

Product Name:	Propane
Synonyms:	LPG (Liquefied Petroleum Gas); LP-Gas.
Product Use:	Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.
Restrictions on Use:	Not available.
Manufacturer/Supplier:	Superior Propane Suite 400, 6750 Century Avenue Mississauga, ON L5N 2V8
Phone Number:	1-877-873-7467
Emergency Phone:	CANUTEC 1-888-CAN-UTEC (226-8832) or 613-996-6666 or *666 on a cellular phone
Date of Preparation of SDS:	August 8, 2016

Section 2: HAZARD(S) IDENTIFICATION

GHS INFORMATION

Classification: Flammable Gases, Category 1
Gases Under Pressure - Compressed Gas
Simple Asphyxiant

LABEL ELEMENTS

Hazard Pictogram(s):



Signal Word: Danger

Hazard Statements:
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary Statements

Prevention: Keep away from heat, sparks, open flames, and 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: Store in a well ventilated place.

Disposal: Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients with Unknown Toxicity: None.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200). This material is considered hazardous by the Hazardous Products Regulations.

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient(s)	Common name / Synonyms	CAS No.	% vol./vol.
Propane	Not available.	74-98-6	90 - 99
Ethane	Not available.	74-84-0	0 - 5
1-Propene	Propylene	115-07-1	0 - 5
Butane	Not available.	106-97-8	0 - 2.5

Section 4: FIRST-AID MEASURES

Inhalation: Call a poison center or doctor if you feel unwell.

Acute and delayed symptoms and effects: May displace oxygen and cause rapid suffocation. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if needed. Continue rinsing. Immediately call a poison center or doctor.

Acute and delayed symptoms and effects: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result. May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin Contact: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. If on skin: Wash with plenty of water. Get immediate medical advice/attention. Thaw frosted parts with lukewarm water. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing.

Acute and delayed symptoms and effects: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin colour to white or grayish-yellow. The pain after contact with liquid can quickly subside. May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Not a normal route of exposure.

Acute and delayed symptoms and effects: Not a normal route of exposure.

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

Note to Physicians: Symptoms may not appear immediately.

Section 5: FIRE-FIGHTING MEASURES

FLAMMABILITY AND EXPLOSION INFORMATION

Extremely flammable gas. Contains gas under pressure; may explode if heated. Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release flammable gas through

pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

If a tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discolouration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.
Sensitivity to Static Discharge: This material is sensitive to static discharge.

MEANS OF EXTINCTION

Suitable Extinguishing Media: Small Fire: Dry chemical or CO2.

Large Fire: Water spray or fog. Move containers from fire area if you can do it without risk.

Unsuitable Extinguishing Media: Not available.

Products of Combustion: Oxides of carbon.

Protection of Firefighters: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. Vapors may cause dizziness or asphyxiation without warning. Some may be irritating if inhaled at high concentrations. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire may produce irritating and/or toxic gases. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

Section 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedures: As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Keep out of low areas. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded.

Personal Precautions: Do not touch or walk through spilled material. Use personal protection recommended in Section 8.

Environmental Precautions: Not normally required.

Methods for Containment: Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray

to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak.

Methods for Clean-Up: Prevent spreading of vapors through sewers, ventilation systems and confined areas. Isolate area until gas has dispersed. CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.

Other Information: See Section 13 for disposal considerations.

Section 7: HANDLING AND STORAGE

Handling:
Avoid breathing gas. Keep away from heat, sparks, open flames, and hot surfaces. No smoking. Pressurized container: Do not pierce or burn, even after use. See Section 8 for information on Personal Protective Equipment.

Storage:
Store in a well-ventilated place. Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Keep out of the reach of children.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines
Component

Propane [CAS No. 74-98-6]
ACGIH: Asphyxia
OSHA: 1000 ppm (TWA), 1800 mg/m³ (TWA);

Ethane [CAS No. 74-84-0]
ACGIH: Asphyxia
OSHA: No PEL established.

Propylene [CAS No. 115-07-1]
ACGIH: 500 ppm (TWA); A4 (2005)
OSHA: No PEL established.

Butane [CAS No. 106-97-8]
ACGIH: 1000 ppm (TWA); (2012)
OSHA: 800 ppm (TWA) [Vacated];

PEL: Permissible Exposure Limit
TWA: Time-Weighted Average
C: Ceiling

Engineering Controls: Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT (PPE)



Eye/Face Protection:	Safety glasses are required. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3-92 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.
Hand Protection:	Wear protective gloves. Wear cold insulating gloves. Consult manufacturer specifications for further information.
Skin and Body Protection:	Wear protective clothing.
Respiratory Protection:	If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4-11, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.
General Hygiene Considerations:	Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Liquefied gas.
Colour:	Colourless.
Odour:	Odourless, unless odourized with ethyl mercaptan (skunky odour, similar to boiling cabbage).
Odour Threshold:	4800 ppm
Physical State:	Gas.
pH:	Not available.
Melting Point / Freezing Point:	-188 °C (-306.4 °F)
Initial Boiling Point:	-42.2 °C (-44 °F)
Boiling Point:	-42 °C (-43.6 °F)
Flash Point:	-103.4 °C (-154.1 °F) (Closed Cup)
Evaporation Rate:	Rapid.
Flammability (solid, gas):	Extremely flammable gas.
Lower Flammability Limit:	2.1%

Upper Flammability Limit:	9.5%
Vapor Pressure:	1435 kPa (maximum) at 37.8 °C (100 °F)
Vapor Density:	1.52 (Air = 1)
Relative Density:	0.51 (Water = 1)
Solubilities:	Slight, 6.1% by volume @ 17.8°C (64 °F)
Partition Coefficient: n-Octanol/Water:	Not available.
Auto-ignition Temperature:	432 °C (809.6 °F)
Decomposition Temperature:	Not available.
Viscosity:	Not available.
Percent Volatile, wt. %:	Not available.
VOC content, wt. %:	Not available.
Density:	Not available.
Coefficient of Water/Oil Distribution:	Not available.

Section 10: STABILITY AND REACTIVITY

Reactivity:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability:	Stable under normal storage conditions.
Possibility of Hazardous Reactions:	Gas explodes spontaneously when mixed with chloride dioxide.
Conditions to Avoid:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Incompatible Materials:	Oxidizers. Chlorine dioxide.
Hazardous Decomposition Products:	Carbon dioxide. Carbon monoxide.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE
Product Toxicity

Oral:	Not available.
Dermal:	Not available.
Inhalation:	Not available.

Component Toxicity

Component	CAS No.	LD_{50} oral	LD_{50} dermal	LC_{50}
Propane	74-98-6	Not available.	Not available.	Not available.
Ethane	74-84-0	Not available.	Not available.	Not available.
Propylene	115-07-1	Not available.	Not available.	86000 mg/m³ (rat); 4H
Butane	106-97-8	Not available.	Not available.	658000 mg/m³ (rat); 4H

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation.

Target Organs: Skin. Eyes. Respiratory system. Central nervous system.

Symptoms (including delayed and immediate effects)

Inhalation: May displace oxygen and cause rapid suffocation. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Eye: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result. May cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin colour to white or grayish-yellow. The pain after contact with liquid can quickly subside. May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Not a normal route of exposure.

Skin Sensitization: Not available.

Respiratory Sensitization: Not available.

Medical Conditions Aggravated By Exposure: Not available.

EFFECTS OF CHRONIC EXPOSURE (from short and long-term exposure)

Target Organs: Skin. Eyes. Respiratory system. Central nervous system.

Chronic Effects: Not available.

Carcinogenicity: Product is not classified as a carcinogen. See Component Carcinogenicity table below for information on individual components.

Component Carcinogenicity

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Propylene	A4	Group 3	Not listed.	Not listed.	Not listed.

Mutagenicity: Not available.

Reproductive Effects: Not available.

Developmental Effects

Teratogenicity: Not available.

Embryotoxicity: Not available.

Toxicologically Synergistic Materials: Not available.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Not available.

Persistence / Degradability: Not available.

Bioaccumulation / Accumulation: Not available.

Mobility in Environment: Not available.

Other Adverse Effects: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Disposal Instructions: Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Section 14: TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)

Proper Shipping Name: UN1075, LIQUEFIED PETROLEUM GASES, 2.1

Class: 2.1

UN Number: UN1075

Packing Group: Not applicable.

Label Code:



Canada Transportation of Dangerous Goods (TDG)

Proper Shipping Name: UN1075, LIQUEFIED PETROLEUM GASES, 2.1

Class: 2.1

UN Number: UN1075

Packing Group: Not applicable.

Label Code:



Section 15: REGULATORY INFORMATION

Chemical Inventories

US (TSCA)
The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)
The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

Federal Regulations
United States
This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Propane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000
Ethane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000

Propylene	Not listed.	Not listed.	Not listed.	313	Not listed.	10000
Butane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000

State Regulations

Massachusetts

US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Component	CAS No.	RTK List
Propane	74-98-6	Listed.
Ethane	74-84-0	Listed.
Propylene	115-07-1	Listed.
Butane	106-97-8	Listed.

New Jersey

US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Component	CAS No.	RTK List
Propane	74-98-6	SHHS
Ethane	74-84-0	SHHS
Propylene	115-07-1	SHHS
Butane	106-97-8	SHHS

Note: SHHS = Special Health Hazard Substance

Pennsylvania

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Component	CAS No.	RTK List
Propane	74-98-6	Listed.
Ethane	74-84-0	Listed.
Propylene	115-07-1	E
Butane	106-97-8	Listed.

Note: E = Environmental Hazard

California Prop 65: This product does not contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Section 16: OTHER INFORMATION

Disclaimer:

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for their own particular use.

Date of Preparation of SDS: August 8, 2016

Version: 1.0

GHS SDS Prepared by: **Deerfoot Consulting Inc.**

Phone: (403) 720-3700

PURELL® Advanced Hand Rub

Version 1.0 SDS Number: 400000000410 Revision Date: 05/03/2017

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : PURELL® Advanced Hand Rub

Manufacturer or supplier's details

Company name of supplier : GOJO Industries, Inc.

Address : One GOJO Plaza, Suite 500
Akron, Ohio 44311

Telephone : 1 (330) 255-6000

Emergency telephone number : 1-800-424-9300 CHEMTREC

Recommended use of the chemical and restrictions on use

Recommended use : Hand Sanitizer

Restrictions on use : This is a personal care or cosmetic product that is safe for consumers and other users under normal and reasonably foreseeable use. Cosmetics and consumer products, specifically defined by regulations around the world, are exempt from the requirement of an SDS for the consumer. While this material is not considered hazardous, this SDS contains valuable information critical to the safe handling and proper use of the product for industrial workplace conditions as well as unusual and unintended exposures such as large spills. This SDS should be retained and available for employees and other users of this product. For specific intended-use guidance, please refer to the information provided on the package or instruction sheet.

Prepared by :

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Physical state	liquid
Colour	clear, colourless, yellow
Odour	alcohol-like

GHS Classification

Flammable liquids : Category 3

Eye irritation : Category 2A

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.

Precautionary statements : **Prevention:**
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear eye protection/ face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Inhalation
Eye contact
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.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical name	CAS-No.	Concentration (%)
Ethyl Alcohol	64-17-5	>= 50 - < 70

Isopropyl Alcohol	67-63-0	>= 1 - < 5

SECTION 4. FIRST AID MEASURES

General advice	:	In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.
If inhaled	:	If inhaled, remove to fresh air. If symptoms persist, call a physician.
In case of skin contact	:	Wash with water and soap as a precaution. Get medical attention if irritation develops and persists.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Seek medical advice.
If swallowed	:	If swallowed, DO NOT induce vomiting. Rinse mouth with water. Obtain medical attention.
Most important symptoms and effects, both acute and delayed	:	Causes serious eye irritation.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray. Flash back possible over considerable distance. May form explosive mixtures in air. Exposure to decomposition products may be a hazard to health. Carbon oxides
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers.

Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Material can create slippery conditions.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapours/mists with a water spray jet. Keep in suitable, closed containers for disposal. Clean contaminated floors and objects thoroughly while observing environmental regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Keep away from heat. Use with local exhaust ventilation. Avoid contact with eyes.
Conditions for safe storage	:	Take measures to prevent the build up of electrostatic charge. Keep in properly labelled containers. Keep container tightly closed in a dry and well-ventilated place. Store in accordance with the particular national regulations.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

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

Ethyl Alcohol	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
Isopropyl Alcohol	67-63-0	TWA	200 ppm 492 mg/m3	CA AB OEL
		STEL	400 ppm 984 mg/m3	CA AB OEL
		TWA	200 ppm	CA BC OEL
		STEL	400 ppm	CA BC OEL
		TWAEV	400 ppm 983 mg/m3	CA QC OEL
		STEV	500 ppm 1,230 mg/m3	CA QC OEL
		TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Isopropyl Alcohol	67-63-0	Acetone	Urine	End of shift at end of workweek	40 mg/l	ACGIH BEI

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

Hand protection
Remarks : No special protective equipment required.

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

Skin and body protection : No special measures necessary provided product is used correctly.

Protective measures : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Ensure that eye flushing systems and safety showers are located close to the working place.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Avoid contact with eyes.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour	:	clear, colourless, yellow
Odour	:	alcohol-like
Odour Threshold	:	No data available
pH	:	6.5 - 8.5, (20 °C)
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	24 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Density	:	0.8743 g/cm3
Solubility(ies)		
Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Thermal decomposition	:	The substance or mixture is not classified self-reactive.
Viscosity		
Viscosity, kinematic	:	3500 - 23000 mm2/s (20 °C)
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous	:	Vapours may form explosive mixture with air.

reactions

Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Strong oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): 124.7 mg/l Exposure time: 4 h Test atmosphere: vapour

Isopropyl Alcohol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): 72.6 mg/l Exposure time: 4 h Test atmosphere: vapour
Acute dermal toxicity	:	LD50 (Rat): > 5,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Components:

Ethyl Alcohol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Isopropyl Alcohol:
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Ethyl Alcohol:
Species: Rabbit

Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

Isopropyl Alcohol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.

Components:

Ethyl Alcohol:
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin contact
Species: Mouse
Result: negative

Isopropyl Alcohol:
Test Type: Buehler Test
Exposure routes: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Germ cell mutagenicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Genotoxicity in vitro	:	Test Type: In vitro mammalian cell gene mutation test Result: negative
Genotoxicity in vivo	:	Test Type: Rodent dominant lethal test (germ cell) (in vivo) Test species: Mouse Application Route: Ingestion Result: negative

Isopropyl Alcohol:

Genotoxicity in vitro	:	Test Type: Bacterial reverse mutation assay (AMES) Result: negative
Genotoxicity in vivo	:	Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Test species: Mouse Application Route: Intraperitoneal injection Result: negative

Carcinogenicity

Not classified based on available information.

Components:

Isopropyl Alcohol:
Species: Rat
Application Route: inhalation (vapour)

Exposure time: 104 weeks
Method: OECD Test Guideline 451
Result: negative

Reproductive toxicity

Not classified based on available information.

Components:

Ethyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 416
Result: negative

Isopropyl Alcohol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT - single exposure

Not classified based on available information.

Components:

Isopropyl Alcohol:

Assessment: May cause drowsiness or dizziness.

STOT - repeated exposure

Not classified based on available information.

Repeated dose toxicity

Components:

Ethyl Alcohol:

Species: Rat
NOAEL: 2,400 mg/kg
Application Route: Ingestion
Exposure time: 2 y

Isopropyl Alcohol:

Species: Rat
NOAEL: 5000 ppm
Application Route: inhalation (vapour)
Exposure time: 104 w
Method: OECD Test Guideline 413

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Ethyl Alcohol:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 9.6 mg/l Exposure time: 9 d
Toxicity to bacteria	:	EC50 (Photobacterium phosphoreum): 32.1 mg/l Exposure time: 0.25 h

Isopropyl Alcohol:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 10,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 10,000 mg/l Exposure time: 24 h
Toxicity to bacteria	:	EC50 (Pseudomonas putida): > 1,050 mg/l Exposure time: 16 h

Persistence and degradability

Components:

Ethyl Alcohol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84 % Exposure time: 20 d

Isopropyl Alcohol:

Biodegradability	:	Result: rapidly degradable

Bioaccumulative potential

Components:

Ethyl Alcohol:

Partition coefficient: n-octanol/water	:	log Pow: -0.35

Isopropyl Alcohol:

Partition coefficient: n-octanol/water	:	log Pow: 0.05

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No.	:	UN 1987
Proper shipping name	:	Alcohols, n.o.s. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355

IMDG-Code

UN number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-D
Marine pollutant	:	no

National Regulations

TDG

UN number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	3
ERG Code	:	127
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : B2: Flammable liquid
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:

TSCA	:	On TSCA Inventory
AICS	:	On the inventory, or in compliance with the inventory
DSL	:	On the inventory, or in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
ISHL	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
NZIoC	:	On the inventory, or in compliance with the inventory

Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

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.

SAFETY DATA SHEET

IR ALL SEASON

Version: 1.0 | Revision Date: 04/01/2015 | Print Date: 04/02/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: IR ALL SEASON

Product Use Description: Lubricant

Company:

Distributor
INGERSOLL RAND
800D BEATY ST
DAVIDSON, NC
28036
United States of America

Telephone: +01 704-655-4000

Emergency telephone number: U.S. 24-Hour Emergency #: 800-424-9300
:
Outside U.S. Emergency #: +01 703-527-3887

Prepared by: Product Safety Department
(US) +1 866-430-2775

Recommended use of the chemical and restrictions on use

Recommended use : Lubricant

Restrictions on use : Reserved for industrial and professional use.

SECTION 2. HAZARDS IDENTIFICATION

Form	liquid
Colour	straw
Odour	mild ester-like

GHS Classification

Skin sensitisation : Category 1

Acute aquatic toxicity : Category 3
Chronic aquatic toxicity : Category 3

GHS Label element

Signal word : **Warning**

Hazard pictograms :



Hazard statements : H317 May cause an allergic skin reaction.
H412 Harmful to aquatic life with long lasting effects.

Other hazards : None

Precautionary statements : **Prevention:**
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves.
Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P363 Wash contaminated clothing before reuse.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

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.

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

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

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene	68411-46-1	>= 1 - < 5 %
N-1-naphthylaniline	90-30-2	>= 0.1 - < 1 %
triphenyl phosphate	115-86-6	>= 0.1 - < 1 %
diphenylamine	122-39-4	>= 0.1 - < 1 %

SECTION 4. FIRST AID MEASURES

If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If not breathing, give artificial respiration.
Call a physician or poison control centre immediately.
If breathing is difficult, give oxygen.
Keep respiratory tract clear.

In case of skin contact : Wash off with soap and plenty of water.
If symptoms persist, call a physician.
Take off contaminated clothing and wash before reuse.

In case of eye contact : If eye irritation persists, consult a specialist.

If swallowed : Rinse mouth with water.
If victim is fully conscious, give a cupful of 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.
Do not give milk or alcoholic beverages.
Obtain medical attention.

Most important symptoms and effects, both acute and delayed : Sensitisation

Notes to physician : For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards during firefighting : Burning produces irritant fumes.
Burning produces noxious and toxic fumes.

Specific extinguishing methods : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Special protective equipment for firefighters : Wear full protective clothing and self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Environmental precautions : No special environmental precautions required.

Methods and materials for containment and cleaning up : Wipe up with absorbent material (e.g. cloth, fleece). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : For personal protection see section 8.
No special handling advice required.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.

Materials to avoid : Strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

N-1-naphthylaniline	90-30-2	TWA	10 ml/m3	ACGIH
triphenyl phosphate	115-86-6	TWA	3 mg/m3	ACGIH
		TWA	3 mg/m3	OSHA Z-1
		TWA	3 mg/m3	OSHA P0
		TWA	3 mg/m3	NIOSH REL
diphenylamine	122-39-4	TWA	10 mg/m3	ACGIH
		TWA	10 mg/m3	OSHA P0
		TWA	10 mg/m3	NIOSH REL

Personal protective equipment

Respiratory protection : No personal respiratory protective equipment normally required.

Hand protection
Remarks : Solvent-resistant gloves (butyl-rubber)

Eye protection : Safety glasses

Skin and body protection : Protective suit

Hygiene measures : General industrial hygiene practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	straw
Odor	:	mild ester-like
Odour Threshold	:	No data available
pour point	:	-40 °C
Boiling point/boiling range	:	No data available
Evaporation rate	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapour pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	0.92
Solubility(ies)		
Water solubility	:	negligible
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Stable under recommended storage conditions.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	No hazards to be specially mentioned.
Conditions to avoid	:	Contamination
Incompatible materials	:	Strong oxidizing agents

Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity (Product)	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method
Acute inhalation toxicity (Product)	:	Acute toxicity estimate: > 40 mg/l Exposure time: 4 h Method: Calculation method
Acute dermal toxicity (Product)	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method
Skin irritation		
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene (Component)	:	Species: Rabbit Result: No skin irritation Method: OECD Test Guideline 404
N-1-naphthylaniline (Component)	:	Species: Rabbit Result: No skin irritation Method: Draize Test
triphenyl phosphate (Component)	:	Species: Rabbit Result: No skin irritation Method: OECD Test Guideline 404 Exposure time: 4 h
diphenylamine (Component)	:	Species: Rabbit Result: Mild skin irritation
Eye irritation		
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene (Component)	:	Species: Rabbit Result: No eye irritation Method: OECD Test Guideline 405
N-1-naphthylaniline (Component)	:	Species: Rabbit Result: No eye irritation Method: OECD Test Guideline 405
triphenyl phosphate (Component)	:	Species: Rabbit Result: No eye irritation Method: OECD Test Guideline 405
diphenylamine (Component)	:	Species: Rabbit Result: Mild eye irritation

Sensitisation (Product) : Remarks: May cause sensitisation by skin contact.

Repeated dose toxicity
diphenylamine (Component) : Species: Mouse, male
Application Route: Oral
Target Organs: Blood, Liver, Kidney
Exposure time: (90 d)
NOEL: 1.7 mg/kg
Lowest observed effect level: 93.8 mg/kg

Species: Mouse, female
Application Route: Oral
Target Organs: Blood, Liver, Kidney
Exposure time: (90 d)
NOEL: 2.1 mg/kg
Lowest observed effect level: 107 mg/kg

CMR effects
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene (Component) : Mutagenicity: Not mutagenic in Ames Test.

N-1-naphthylaniline (Component) : Carcinogenicity: Animal testing did not show any carcinogenic effects.
Mutagenicity: Animal testing did not show any mutagenic effects., Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

triphenyl phosphate (Component) : Carcinogenicity: Animal testing did not show any carcinogenic effects.
Mutagenicity: In vitro tests did not show mutagenic effects
Reproductive toxicity: No toxicity to reproduction

diphenylamine (Component) : Carcinogenicity: Not classifiable as a human carcinogen.
Mutagenicity: Animal testing did not show any mutagenic effects.
Teratogenicity: No toxicity to reproduction
Reproductive toxicity: No toxicity to reproduction

Further information (Product) : No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish
Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene (Component) : LC50: > 71 mg/l
Exposure time: 96 h

Species: Danio rerio (zebra fish)

Method: OECD Test Guideline 203

N-1-naphthylaniline (Component)	:	LC50: 0.44 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout) semi-static test Analytical monitoring: yes
triphenyl phosphate (Component)	:	LC50: 0.78 mg/l Exposure time: 96 h Species: Lepomis macrochirus (Bluegill sunfish) static test LC50: 1.2 mg/l Exposure time: 96 h Species: Oryzias latipes (Orange-red killifish) static test
diphenylamine (Component)	:	LC50: 2.2 mg/l Exposure time: 96 h Species: Oncorhynchus mykiss (rainbow trout)

Toxicity to daphnia and other aquatic invertebrates

Benzenamine, N-phenyl-, reaction products with 2,4,4-trimethylpentene (Component)	:	EC50: 51 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) Method: OECD Test Guideline 202
N-1-naphthylaniline (Component)	:	EC50: 0.68 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) semi-static test Analytical monitoring: yes
triphenyl phosphate (Component)	:	EC50: 1 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea) EC50: 0.36 mg/l Exposure time: 48 h
diphenylamine (Component)	:	EC50: 1.2 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea)

Toxicity to algae

Benzenamine, N-phenyl-, reaction products with 2,4,4-	:	EbC50: > 100 mg/l Exposure time: 72 h

trimethylpentene (Component)		Species: Desmodesmus subspicatus (green algae) Method: OECD Test Guideline 201
triphenyl phosphate (Component)	:	NOEC: 0.25 - 2.5 mg/l Exposure time: 72 h Species: Green algae (Scenedesmus subspicatus) Growth inhibition Method: OECD Test Guideline 201

Toxicity to bacteria

N-1-naphthylaniline (Component)	:	EC50: 2 mg/l Exposure time: 48 h Species: Protozoa EC50: > 10,000 mg/l Exposure time: 3 h Species: Bacteria

Toxicity to fish (Chronic toxicity)

triphenyl phosphate (Component)	:	NOEC: 0.037 mg/l Exposure time: 30 d Species: Oncorhynchus mykiss (rainbow trout)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

N-1-naphthylaniline (Component)	:	NOEC: 0.02 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Analytical monitoring: yes

Elimination information (persistence and degradability)

Bioaccumulation (Product)	:	Remarks: No data available
Mobility (Product)	:	Remarks: No data available
Biodegradability (Product)	:	Remarks: No data available

Further information on ecology

Ecotoxicology Assessment

Results of PBT assessment (Product)
No data available

Additional ecological information (Product)	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. This product has no known ecotoxicological effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of wastes in an approved waste disposal facility.
The product should not be allowed to enter drains, water courses or the soil.
In accordance with local and national regulations.
Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with chemical or used container.

Contaminated packaging : Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

ADR
Not dangerous goods

RID
Not dangerous goods

MERCOSUR
Not dangerous goods

DOT
Not dangerous goods

IATA
Not dangerous goods

IMDG
Not dangerous goods

Additional advice: Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
1-naphthylamine	134-32-7	100	*
2-naphthylamine	91-59-8	10	*

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
aniline	62-53-3	5000	*

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 311/312 Hazards : Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop 65 WARNING! This product contains a chemical known to the State of California to cause cancer.

aniline	62-53-3
1-naphthylamine	134-32-7
2-naphthylamine	91-59-8
naphthalene	91-20-3

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

US.TSCA	On TSCA Inventory
DSL	All components of this product are on the Canadian DSL.
AICS	On the inventory, or in compliance with the inventory
NZIoC	On the inventory, or in compliance with the inventory
ENCS	On the inventory, or in compliance with the inventory
KECI	On the inventory, or in compliance with the inventory
PICCS	On the inventory, or in compliance with the inventory
IECSC	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

Further information

IR ALL SEASON

Version: 1.0 Revision Date: 04/01/2015 Print Date: 04/02/2015

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.

safety data sheet

according to Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU

Activated carbon powder, for decolourisation

article number: **5963**
Version: **1.0 en**

date of compilation: 2016-07-28

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Identification of the substance	**Activated carbon**
Article number	5963
Registration number (REACH)	01-2119488716-22-XXXX
EC number	931-334-3
CAS number	7440-44-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: laboratory chemical

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
e-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet : Department Health, Safety and Environment

e-mail (competent person) : sicherheit@carlroth.de

1.4 Emergency telephone number

Emergency information service **Poison Centre Munich: +49/(0)89 19240**

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP)

Classification acc. to GHS

Section	Hazard class	Hazard class and category	Hazard statement
2.11	self-heating substance and mixture	(Self-heat. 2)	H252

Remarks
For full text of Hazard- and EU Hazard-statements: see SECTION 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Signal word **Warning**

Pictograms



Hazard statements

H252 Self-heating in large quantities; may catch fire.

Precautionary statements

Precautionary statements - prevention

P235+P410 Keep cool. Protect from sunlight.

Precautionary statements - storage

P407 Maintain air gap between stacks/pallets.
P413 Store bulk masses greater than 10 kg/22 lbs at temperatures not exceeding 50 °C/122 °F.

Labelling of packages where the contents do not exceed 125 ml
Signal word: **Warning**
Symbol(s)



2.3 Other hazards

There is no additional information.

SECTION 3: Composition/information on ingredients

3.1 Substances

Name of substance	Activated carbon
Registration number (REACH)	01-2119488716-22-XXXX
EC number	931-334-3
CAS number	7440-44-0
Molecular formula	C
Molar mass	12,01 $^{g}/_{mol}$

SECTION 4: First aid measures

4.1 Description of first aid measures



General notes

Take off contaminated clothing.

Following inhalation

Provide fresh air. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Rinse skin with water/shower.

Following eye contact

Rinse cautiously with water for several minutes. In all cases of doubt, or when symptoms persist, seek medical advice.

Following ingestion

Rinse mouth. Call a doctor if you feel unwell.

4.2 Most important symptoms and effects, both acute and delayed

Irritant effects

4.3 Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Co-ordinate fire-fighting measures to the fire surroundings
water spray, foam, dry extinguishing powder, carbon dioxide (CO2)

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Danger of spontaneous combustion.

Hazardous combustion products

In case of fire may be liberated: carbon monoxide (CO), carbon dioxide (CO2)

5.3 Advice for firefighters

Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Control of dust. Eliminate all ignition sources if safe to do so.

6.2 Environmental precautions

Keep away from drains, surface and ground water.

6.3 Methods and material for containment and cleaning up

Advices on how to contain a spill

Covering of drains.

Advices on how to clean up a spill

Take up mechanically. Control of dust.

Other information relating to spills and releases

Place in appropriate containers for disposal.

Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide adequate ventilation as well as local exhaustion at critical locations. Avoidance of ignition sources.

• Measures to prevent fire as well as aerosol and dust generation

Removal of dust deposits.

Advice on general occupational hygiene

Wash hands before breaks and after work. When using do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed. Store in a dry place.

Incompatible substances or mixtures

Observe hints for combined storage.

Consideration of other advice

• Ventilation requirements

Use local and general ventilation.

• Specific designs for storage rooms or vessels

Recommended storage temperature: 15 - 25 °C.
Maximum storage temperature: <50 °C.

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

Coun-try	Name of agent	Notation	Identifier	TWA [mg/m³]	STEL [mg/m³]	Source
GB	dust	i	WEL	10		EH40/2005
GB	dust	r	WEL	4		EH40/2005
GB	graphite	i	WEL	10		EH40/2005
GB	graphite	r	WEL	4		EH40/2005

Notation

i	Inhalable fraction
r	Respirable fraction
STEL	Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period unless otherwise specified
TWA	Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average

Relevant DNELs/DMELs/PNECs and other threshold levels

• human health values

Endpoint	Threshold level	Protection goal, route of exposure	Used in	Exposure time
DNEL	3 mg/m³	human, inhalatory	worker (industry)	chronic - systemic effects

8.2 Exposure controls

Individual protection measures (personal protective equipment)



Eye/face protection

Use safety goggle with side protection.

Skin protection

• hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

• type of material

NBR (Nitrile rubber)

• material thickness

>0,11 mm.

• breakthrough times of the glove material

>480 minutes (permeation: level 6)

• other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Respiratory protection

Respiratory protection necessary at: Dust formation. Particulate filter device (EN 143). P2 (filters at least 94 % of airborne particles, colour code: White).

Environmental exposure controls

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	solid (powder)
Colour	black
Odour	odourless
Odour threshold	No data available

Other physical and chemical parameters

pH (value)	This information is not available.
Melting point/freezing point	>1.000 °C
Initial boiling point and boiling range	This information is not available.
Flash point	not applicable
Evaporation rate	no data available
Flammability (solid, gas)	Self-heating substance in accordance with GHS criteria
Explosive limits	
• lower explosion limit (LEL)	(20 g/m³)
• upper explosion limit (UEL)	this information is not available
Explosion limits of dust clouds	these information are not available
• lower explosion limit (LEL)	20 g/m³
Vapour pressure	This information is not available.
Density	1,7 $^{kg}/_{m^3}$
Vapour density	This information is not available.
Relative density	Information on this property is not available.

Solubility(ies)	
Water solubility	no data available
Partition coefficient	
n-octanol/water (log KOW)	This information is not available.
Auto-ignition temperature	Information on this property is not available.
Decomposition temperature	>500 °C
Viscosity	not relevant (solid matter)
Explosive properties	shall not be classified as explosive
Oxidising properties	none

9.2 Other information

There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity

self-heating property. risk of ignition. Dust explosibility.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Violent reaction with: Strong oxidiser

10.4 Conditions to avoid

Keep away from heat. Decompostion takes place from temperatures above: >500 °C.

10.5 Incompatible materials

There is no additional information.

10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Shall not be classified as acutely toxic.

Exposure route	Endpoint	Value	Species	Source
oral	LD50	>5.000 $^{mg}/_{kg}$	rat	TOXNET

Skin corrosion/irritation

Shall not be classified as corrosive/irritant to skin.

Serious eye damage/eye irritation
Shall not be classified as seriously damaging to the eye or eye irritant.

Respiratory or skin sensitisation
Shall not be classified as a respiratory or skin sensitiser.

Summary of evaluation of the CMR properties
Shall not be classified as germ cell mutagenic, carcinogenic nor as a reproductive toxicant

• Specific target organ toxicity - single exposure
Shall not be classified as a specific target organ toxicant (single exposure).

• Specific target organ toxicity - repeated exposure
Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard
Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics

• If swallowed
data are not available

• If in eyes
causes slight to moderate irritation

• If inhaled
Inhalation of dust may cause irritation of the respiratory system

• If on skin
Frequently or prolonged contact with skin may cause dermal irritation

Other information
None

SECTION 12: Ecological information

12.1 Toxicity
acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

12.2 Process of degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
Data are not available.

12.4 Mobility in soil
Data are not available.

12.5 Results of PBT and vPvB assessment
Data are not available.

12.6 Other adverse effects
Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packagings

It is a dangerous waste; only packagings which are approved (e.g. acc. to ADR) may be used.

13.2 Relevant provisions relating to waste

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1	UN number	**1362**
14.2	UN proper shipping name	**CARBON, ACTIVATED**
	Hazardous ingredients	Activated carbon
14.3	Transport hazard class(es)	
	Class	4.2 (substances liable to spontaneous combustion)
14.4	Packing group	III (substance presenting low danger)
14.5	Environmental hazards	none (non-environmentally hazardous acc. to the dangerous goods regulations)

14.6 Special precautions for user

Provisions for dangerous goods (ADR) should be complied within the premises.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code

The cargo is not intended to be carried in bulk.

14.8 Information for each of the UN Model Regulations

• Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)

UN number	1362
Proper shipping name	CARBON, ACTIVATED
Particulars in the transport document	UN1362, CARBON, ACTIVATED, 4.2, III, (E)
Class	4.2
Classification code	S2
Packing group	III
Danger label(s)	4.2



Special provisions (SP)	646
Excepted quantities (EQ)	E1
Limited quantities (LQ)	0
Transport category (TC)	4
Tunnel restriction code (TRC)	E
Hazard identification No	40
Emergency Action Code	1Y

• International Maritime Dangerous Goods Code (IMDG)

UN number	1362
Proper shipping name	CARBON, ACTIVATED
Particulars in the shipper's declaration	UN1362, CARBON, ACTIVATED, 4.2, III
Class	4.2
Packing group	III
Danger label(s)	4.2



Special provisions (SP)	223, 925
Excepted quantities (EQ)	E1
Limited quantities (LQ)	0
EmS	F-A, S-J
Stowage category	A

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant provisions of the European Union (EU)

• Regulation 649/2012/EU concerning the export and import of hazardous chemicals (PIC)
Not listed.

• Regulation 1005/2009/EC on substances that deplete the ozone layer (ODS)
Not listed.

• Regulation 850/2004/EC on persistent organic pollutants (POP)
Not listed.

• Restrictions according to REACH, Annex XVII
not listed

• List of substances subject to authorisation (REACH, Annex XIV)
not listed

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) - Annex II
not listed

Regulation 166/2006/EC concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)
not listed

Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD)
not listed

National inventories
Substance is listed in the following national inventories:

- EINECS/ELINCS/NLP (Europe)
- REACH (Europe)

15.2 Chemical Safety Assessment
No Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
ADN	Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
CMR	Carcinogenic, Mutagenic or toxic for Reproduction
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EH40/2005	EH40/2005 Workplace exposure limits (http://www.nationalarchives.gov.uk/doc/open-government-licence/)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IMDG	International Maritime Dangerous Goods Code
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant)
NLP	No-Longer Polymer

Abbr.	Descriptions of used abbreviations
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)
STEL	short-term exposure limit
TWA	time-weighted average
vPvB	very Persistent and very Bioaccumulative
WEL	workplace exposure limit

Key literature references and sources for data

- Regulation (EC) No. 1907/2006 (REACH), amended by 2015/830/EU
- Regulation (EC) No. 1272/2008 (CLP, EU GHS)

List of relevant phrases (code and full text as stated in chapter 2 and 3)

Code	Text
H252	self-heating in large quantities; may catch fire

Disclaimer

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

SAFETY DATA SHEET

Revision Date 04-Sep-2015 **Version** 3

1. IDENTIFICATION

Product identifier
Product Name Spray Nine® 32 fl.oz

Other means of identification
Product Code 26810
Synonyms None

Recommended use of the chemical and restrictions on use
Recommended Use Cleaner
Uses advised against No information available

Details of the supplier of the safety data sheet

Manufacturer Address
ITW Permatex
6875 Parkland Blvd.
Solon, OH 44139 USA

Distributor
ITW Permatex Canada
35 Brownridge Road, Unit 1
Halton Hills, ON Canada L7G 0C6
Telephone: (800) 924-6994

Company Phone Number 1-87-Permatex
(877) 376-2839

24 Hour Emergency Phone Number Chem-Tel: 800-255-3924
International Emergency:
00+1+ 813-248-0585
Contract Number: MIS0003453

E-mail address mail@permatex.com

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health

Appearance Clear **Physical state** Liquid **Odor** Citrus

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Not applicable

Other Information
- Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

substance(s)

Chemical Name	CAS No	Weight-%	Trade Secret
WATER	7732-18-5	60 - 100	*
ETHOXYLATED C9-C11 ALCOHOLS	68439-46-3	1 - 5	*
DIPROPYLENE GLYCOL MONONBUTYL ETHER	29911-28-2	1 - 5	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of first aid measures

General advice Get medical advice/attention if you feel unwell.

Eye contact 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.

Skin contact IF ON SKIN:. Wash skin with soap and water. If skin irritation persists, call a physician. Wash contaminated clothing before reuse.

Inhalation IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a physician.

Ingestion IF SWALLOWED:. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician.

Self-protection of the first aider Use personal protective equipment as required.

Most important symptoms and effects, both acute and delayed

Symptoms See section 2 for more information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Carbon dioxide (CO2), Dry chemical, Foam

Unsuitable extinguishing media
None.

Specific hazards arising from the chemical
None in particular.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with eyes and skin. Wash thoroughly after handling.

Environmental precautions

Environmental precautions Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Ensure adequate ventilation. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin and eyes.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep from freezing.

Incompatible materials Strong oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .
NIOSH IDLH Immediately Dangerous to Life or Health

Other Information Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Appropriate engineering controls

Engineering Controls Eyewash stations

Individual protection measures, such as personal protective equipment

Eye/face protection Tight sealing safety goggles.

Skin and body protection Wear protective natural rubber, nitrile rubber, Neoprene™ or PVC gloves.

Respiratory protection Use NIOSH-approved air-purifying respirator with organic vapor cartridge or canister, as appropriate.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of

equipment, work area and clothing is recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Clear
Odor	Citrus
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	No information available	
Melting point / freezing point	No information available	
Boiling point / boiling range	100 °C / 212 °F	
Flash point	> 93 °C / > 200 °F	Tag Closed Cup
Evaporation rate	< 1	Butyl acetate = 1
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	18 mm Hg	
Vapor density	>1	Air = 1
Relative density	1.02 g/ml	
Water solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	<0.5%
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Keep from freezing.

Incompatible materials
Strong oxidizing agents

Hazardous Decomposition Products
Carbon oxides

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation May cause irritation of respiratory tract.

Eye contact Contact with eyes may cause irritation. May cause redness and tearing of the eyes.

Skin contact May cause skin irritation and/or dermatitis.

Ingestion Ingestion may cause irritation to mucous membranes.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
WATER 7732-18-5	> 90 mL/kg (Rat)	-	-
ETHOXYLATED C9-C11 ALCOHOLS 68439-46-3	= 1378 mg/kg (Rat) = 1400 mg/kg (Rat)	> 2 g/kg (Rabbit)	-
DIPROPYLENE GLYCOL MONONBUTYL ETHER 29911-28-2	= 1620 µL/kg (Rat)	= 5860 µL/kg (Rabbit)	= 42.1 ppm (Rat) 4 h

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 39421 mg/kg
ATEmix (dermal) 76980 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

3.17 % of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea
DIPROPYLENE GLYCOL MONONBUTYL ETHER 29911-28-2	-	841: 96 h Poecilia reticulata mg/L LC50 static	-

Persistence and degradability
No information available.

Bioaccumulation
No information available.

Mobility
No information available.

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated packaging	Do not reuse container.
US EPA Waste Number	Not applicable

14. TRANSPORT INFORMATION

DOT
Proper shipping name: Not regulated

IATA
Proper shipping name: Not regulated

IMDG
Proper shipping name: Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Not determined
ENCS	Not determined
IECSC	Complies
KECL	Not determined
PICCS	Not determined
AICS	Not determined

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
ETHANOL - 64-17-5	Carcinogen Developmental

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
SODIUM HYDROXIDE 1310-73-2	X	X	X
ETHANOL 64-17-5	X	X	X

U.S. EPA Label Information
EPA Pesticide Registration Number 6659-3
EPA Statement
This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals.

WHMIS Hazard Class
Non-controlled

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA	**Health hazards** 1	**Flammability** 1	**Instability** 0	-
HMIS	**Health hazards** 1	**Flammability** 1	**Physical hazards** 0	**Personal protection** B

NFPA (National Fire Protection Association)
HMIS (Hazardous Material Information System)

Revision Date 04-Sep-2015

Disclaimer
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.

End of Safety Data Sheet

Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier
3M™ Spray Trim Adhesive Clear, PN 08074

Product Identification Numbers
60-9800-4439-4

1.2. Recommended use and restrictions on use

Recommended use
Aerosol adhesive., Automotive trim adhesive.

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Automotive Aftermarket
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number
1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

The label elements below were prepared in accordance with OSHA Hazard Communication Standard, 29 CFR 1910.1200. This information may be different from the actual product label information for labels regulated by other agencies.

2.1. Hazard classification
Flammable Aerosol: Category 1.
Gas Under Pressure: Liquefied gas.
Serious Eye Damage/Irritation: Category 2A.
Skin Corrosion/Irritation: Category 2.
Reproductive Toxicity: Category 2.
Simple Asphyxiant.
Specific Target Organ Toxicity (single exposure): Category 1.
Specific Target Organ Toxicity (single exposure): Category 3.

2.2. Label elements
Signal word

Danger

Symbols
Flame | Gas cylinder | Exclamation mark | Health Hazard |

Pictograms



Hazard Statements
Extremely flammable aerosol.
Contains gas under pressure; may explode if heated.

Causes serious eye irritation.
Causes skin irritation.
May cause drowsiness or dizziness.
Suspected of damaging fertility or the unborn child.
May displace oxygen and cause rapid suffocation.

Causes damage to organs:
cardiovascular system |

Precautionary Statements
General:
Keep out of reach of children.

Prevention:
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not spray on an open flame or other ignition source.
Pressurized container: Do not pierce or burn, even after use.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.

Response:
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.
If eye irritation persists: Get medical advice/attention.
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
Specific treatment (see Notes to Physician on this label).
Call a POISON CENTER or doctor/physician if you feel unwell.

Storage:
Protect from sunlight. Do not expose to temperatures exceeding 50C/122F.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal:
Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

Notes to Physician:
Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary.

2.3. Hazards not otherwise classified
Intentional misuse by deliberately concentrating and inhaling contents can be harmful or fatal.

16% of the mixture consists of ingredients of unknown acute dermal toxicity.
25% of the mixture consists of ingredients of unknown acute inhalation toxicity.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Acetone	67-64-1	20 - 30 Trade Secret *
Non-Volatile Components - NJTS# 04499600-6433P	Trade Secret*	20 - 30 Trade Secret *
Propane	74-98-6	15 - 25 Trade Secret *
Hydrotreated Light Naphtha (Petroleum)	64742-49-0	10 - 20 Trade Secret *
Cyclohexane	110-82-7	5 - 10 Trade Secret *
Hexane	110-54-3	0.1 - 1.0 Trade Secret *

NJTS or NJTSRN: New Jersey Trade Secret Registry Number.

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. Get medical attention.

Skin Contact:
Immediately wash with soap and water. Remove contaminated clothing and wash before reuse. If signs/symptoms develop, get medical attention.

Eye Contact:
Immediately flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. Get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required
Exposure may increase myocardial irritability. Do not administer sympathomimetic drugs unless absolutely necessary.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture
Closed containers exposed to heat from fire may build pressure and explode.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion

5.3. Special protective actions for fire-fighters
Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Evacuate area. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use only non-sparking tools. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Warning! A motor could be an ignition source and could cause flammable gases or vapors in the spill area to burn or explode. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

6.2. Environmental precautions
Avoid release to the environment.

6.3. Methods and material for containment and cleaning up
If possible, seal leaking container. Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available. Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible using non-sparking tools. Place in a metal container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Do not use in a confined area with minimal air exchange. Keep out of reach of children. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not spray on an open flame or other ignition source. Do not pierce or burn, even after use. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Use personal protective equipment (gloves, respirators, etc.) as required.

7.2. Conditions for safe storage including any incompatibilities
Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Do not expose to temperatures exceeding 50C/122F. Store away from heat. Store away from acids. Store away from oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
Hexane	110-54-3	ACGIH	TWA:50 ppm	Skin Notation
Hexane	110-54-3	OSHA	TWA:1800 mg/m3(500 ppm)	
Cyclohexane	110-82-7	ACGIH	TWA:100 ppm	
Cyclohexane	110-82-7	OSHA	TWA:1050 mg/m3(300 ppm)	
Hydrotreated Light Naphtha (Petroleum)	64742-49-0	CMRG	TWA:50 ppm	
Acetone	67-64-1	OSHA	TWA:2400 mg/m3(1000 ppm)	
Acetone	67-64-1	ACGIH	TWA:250 ppm;STEL:500 ppm	A4: Not class. as human carcin
Propane	74-98-6	ACGIH	Limit value not established:	
Propane	74-98-6	OSHA	TWA:1800 mg/m3(1000 ppm)	

ACGIH : American Conference of Governmental Industrial Hygienists
AIHA : American Industrial Hygiene Association
CMRG : Chemical Manufacturer's Recommended Guidelines
OSHA : United States Department of Labor - Occupational Safety and Health Administration
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit
CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls
Do not remain in area where available oxygen may be reduced. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Indirect Vented Goggles

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing.
Gloves made from the following material(s) are recommended: Nitrile Rubber

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
Half facepiece or full facepiece supplied-air respirator

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid
Specific Physical Form:	Aerosol
Odor, Color, Grade:	Clear liquid with sweet, fruity odor.
Odor threshold	*No Data Available*
pH	*Not Applicable*
Melting point	*Not Applicable*
Boiling Point	*No Data Available*
Flash Point	-42.0 ºF [*Test Method:* Tagliabue Closed Cup]
Evaporation rate	1.9 [*Ref Std:* ETHER=1]
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Vapor Density	2.97 [*Ref Std:* AIR=1]
Density	0.726 g/ml
Specific Gravity	0.726 [*Ref Std:* WATER=1]
Solubility- non-water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	*No Data Available*
Hazardous Air Pollutants	0.025 lb HAPS/lb solids [*Test Method:* Calculated]
Volatile Organic Compounds	51 % weight [*Test Method:* calculated per CARB title 2]
Percent volatile	75 % weight
VOC Less H2O & Exempt Solvents	481 g/l [*Test Method:* calculated SCAQMD rule 443.1]

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat
Sparks and/or flames

10.5. Incompatible materials
Not determined

10.6. Hazardous decomposition products

Substance	**Condition**
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
Intentional concentration and inhalation may be harmful or fatal.

Simple Asphyxiation: Signs/symptoms may include increased heart rate, rapid respirations, drowsiness, headache, incoordination, altered judgement, nausea, vomiting, lethargy, seizures, coma, and may be fatal.

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

May cause additional health effects (see below).

Skin Contact:
Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, dryness, cracking, blistering, and pain.

Eye Contact:
Severe Eye Irritation: Signs/symptoms may include significant redness, swelling, pain, tearing, cloudy appearance of the cornea, and impaired vision.

Ingestion:
Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

May cause additional health effects (see below).

Additional Health Effects:

Single exposure may cause target organ effects:
Central Nervous System (CNS) Depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

Single exposure, above recommended guidelines, may cause:
Cardiac Sensitization: Signs/symptoms may include irregular heartbeat (arrhythmia), faintness, chest pain, and may be fatal.

Reproductive/Developmental Toxicity:
Contains a chemical or chemicals which can cause birth defects or other reproductive harm.

Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Dermal		No data available; calculated ATE > 5,000 mg/kg
Overall product	Inhalation-Vapor(4 hr)		No data available; calculated ATE > 50 mg/l

Overall product	Ingestion		No data available; calculated ATE > 5,000 mg/kg
Propane	Inhalation-Gas (4 hours)	Rat	LC50 > 200,000 ppm
Acetone	Dermal	Rabbit	LD50 > 15,688 mg/kg
Acetone	Inhalation-Vapor (4 hours)	Rat	LC50 76 mg/l
Acetone	Ingestion	Rat	LD50 5,800 mg/kg
Cyclohexane	Dermal	Rat	LD50 > 2,000 mg/kg
Cyclohexane	Inhalation-Vapor (4 hours)	Rat	LC50 > 32.9 mg/l
Cyclohexane	Ingestion	Rat	LD50 6,200 mg/kg
Hydrotreated Light Naphtha (Petroleum)	Dermal	Rabbit	LD50 > 3,160 mg/kg
Hydrotreated Light Naphtha (Petroleum)	Inhalation-Vapor (4 hours)	Rat	LC50 > 14.7 mg/l
Hydrotreated Light Naphtha (Petroleum)	Ingestion	Rat	LD50 > 5,000 mg/kg
Non-Volatile Components - NJTS# 04499600-6433P	Dermal		LD50 estimated to be > 5,000 mg/kg
Non-Volatile Components - NJTS# 04499600-6433P	Ingestion		LD50 estimated to be 2,000 - 5,000 mg/kg
Hexane	Dermal	Rabbit	LD50 > 2,000 mg/kg
Hexane	Inhalation-Vapor (4 hours)	Rat	LC50 170 mg/l
Hexane	Ingestion	Rat	LD50 > 28,700 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Propane	Rabbit	Minimal irritation
Acetone	Mouse	Minimal irritation
Cyclohexane	Rabbit	Mild irritant
Hydrotreated Light Naphtha (Petroleum)	Rabbit	Irritant
Non-Volatile Components - NJTS# 04499600-6433P	Professional judgement	Minimal irritation
Hexane	Human and animal	Mild irritant

Serious Eye Damage/Irritation

Name	Species	Value
Propane	Rabbit	Mild irritant
Acetone	Rabbit	Severe irritant
Cyclohexane	Rabbit	Mild irritant
Hydrotreated Light Naphtha (Petroleum)	Rabbit	Mild irritant
Hexane	Rabbit	Mild irritant

Skin Sensitization

Name	Species	Value
Hydrotreated Light Naphtha (Petroleum)	Guinea pig	Not sensitizing
Hexane	Human	Not sensitizing

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value

Propane	In Vitro	Not mutagenic
Acetone	In vivo	Not mutagenic
Acetone	In Vitro	Some positive data exist, but the data are not sufficient for classification
Cyclohexane	In Vitro	Not mutagenic
Cyclohexane	In vivo	Some positive data exist, but the data are not sufficient for classification
Hydrotreated Light Naphtha (Petroleum)	In Vitro	Not mutagenic
Hexane	In Vitro	Not mutagenic
Hexane	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Acetone	Not Specified	Multiple animal species	Not carcinogenic
Hydrotreated Light Naphtha (Petroleum)	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification
Hexane	Dermal	Mouse	Not carcinogenic
Hexane	Inhalation	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
Acetone	Ingestion	Some positive male reproductive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,700 mg/kg/day	13 weeks
Acetone	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 5.2 mg/l	during organogenesis
Cyclohexane	Inhalation	Not toxic to female reproduction	Rat	NOAEL 24 mg/l	2 generation
Cyclohexane	Inhalation	Not toxic to male reproduction	Rat	NOAEL 24 mg/l	2 generation
Cyclohexane	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 6.9 mg/l	2 generation
Hexane	Ingestion	Not toxic to development	Mouse	NOAEL 2,200 mg/kg/day	during organogenesis
Hexane	Inhalation	Some positive developmental data exist, but the data are not sufficient for classification	Rat	NOAEL 0.7 mg/l	during gestation
Hexane	Ingestion	Toxic to male reproduction	Rat	NOAEL 1,140 mg/kg/day	90 days
Hexane	Inhalation	Toxic to male reproduction	Rat	LOAEL 3.52 mg/l	28 days

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Propane	Inhalation	cardiac sensitization	Causes damage to organs	Human	NOAEL Not available	
Propane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	
Propane	Inhalation	respiratory irritation	All data are negative	Human	NOAEL Not available	
Acetone	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	

Acetone	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	
Acetone	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 1.19 mg/l	6 hours
Acetone	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL Not available	
Acetone	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	poisoning and/or abuse
Cyclohexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human and animal	NOAEL Not available	
Cyclohexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Human and animal	NOAEL Not available	
Cyclohexane	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Professional judgement	NOAEL Not available	
Hydrotreated Light Naphtha (Petroleum)	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human and animal	NOAEL Not available	
Hydrotreated Light Naphtha (Petroleum)	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	
Hydrotreated Light Naphtha (Petroleum)	Ingestion	central nervous system depression	May cause drowsiness or dizziness	Professional judgement	NOAEL Not available	
Hexane	Inhalation	central nervous system depression	May cause drowsiness or dizziness	Human	NOAEL Not available	not available
Hexane	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rabbit	NOAEL Not available	8 hours
Hexane	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 24.6 mg/l	8 hours

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Acetone	Dermal	eyes	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL Not available	3 weeks
Acetone	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 3 mg/l	6 weeks
Acetone	Inhalation	immune system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL 1.19 mg/l	6 days
Acetone	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Guinea pig	NOAEL 119 mg/l	not available
Acetone	Inhalation	heart | liver	All data are negative	Rat	NOAEL 45 mg/l	8 weeks
Acetone	Ingestion	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 900 mg/kg/day	13 weeks
Acetone	Ingestion	heart	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 2,500 mg/kg/day	13 weeks
Acetone	Ingestion	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 200 mg/kg/day	13 weeks
Acetone	Ingestion	liver	Some positive data exist, but the	Mouse	NOAEL	14 days

			data are not sufficient for classification		3,896 mg/kg/day	
Acetone	Ingestion	eyes	All data are negative	Rat	NOAEL 3,400 mg/kg/day	13 weeks
Acetone	Ingestion	respiratory system	All data are negative	Rat	NOAEL 2,500 mg/kg/day	13 weeks
Acetone	Ingestion	muscles	All data are negative	Rat	NOAEL 2,500 mg/kg	13 weeks
Acetone	Ingestion	skin | bone, teeth, nails, and/or hair	All data are negative	Mouse	NOAEL 11,298 mg/kg/day	13 weeks
Cyclohexane	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 24 mg/l	90 days
Cyclohexane	Inhalation	auditory system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1.7 mg/l	90 days
Cyclohexane	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rabbit	NOAEL 2.7 mg/l	10 weeks
Cyclohexane	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 24 mg/l	14 weeks
Cyclohexane	Inhalation	peripheral nervous system	All data are negative	Rat	NOAEL 8.6 mg/l	30 weeks
Hexane	Inhalation	peripheral nervous system	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL Not available	occupational exposure
Hexane	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Mouse	LOAEL 1.76 mg/l	13 weeks
Hexane	Inhalation	liver	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	6 months
Hexane	Inhalation	kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 1.76 mg/l	6 months
Hexane	Inhalation	hematopoietic system	Some positive data exist, but the data are not sufficient for classification	Mouse	NOAEL 35.2 mg/l	13 weeks
Hexane	Inhalation	auditory system | immune system | eyes	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
Hexane	Inhalation	heart | skin | endocrine system	All data are negative	Rat	NOAEL 1.76 mg/l	6 months
Hexane	Ingestion	peripheral nervous system	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL 1,140 mg/kg/day	90 days
Hexane	Ingestion	endocrine system | hematopoietic system | liver | immune system | kidney and/or bladder	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	13 weeks

Aspiration Hazard

Name	Value
Cyclohexane	Aspiration hazard
Hydrotreated Light Naphtha (Petroleum)	Aspiration hazard
Hexane	Aspiration hazard

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Incinerate in a permitted waste incineration facility. Facility must be capable of handling aerosol cans. As a disposal alternative, utilize an acceptable permitted waste disposal facility. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

SECTION 14: Transport Information

For Transport Information, please visit http://3M.com/Transportinfo or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations
Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - Yes Pressure Hazard - Yes Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - Yes

Section 313 Toxic Chemicals subject to the reporting requirements of that section and 40 CFR part 372 (EPCRA):

Ingredient	C.A.S. No	% by Wt
Cyclohexane	110-82-7	Trade Secret 5 - 10

15.2. State Regulations
Contact 3M for more information.

15.3. Chemical Inventories
The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact 3M for more information.

15.4. International Regulations
This material contains one or more ingredients that may be regulated by the International Traffic in Arms Regulation (ITAR), an export control of US military technology and chemicals. Prior to export of this material or any product containing this material, determine whether a proper license from the Department of State must be obtained. See 22CFR 120-130 for any specific requirements.

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification
Health: 2 **Flammability:** 4 **Instability:** 0 **Special Hazards:** None
Aerosol Storage Code: 3

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Document Group:	16-5270-0	**Version Number:**	8.01
Issue Date:	05/09/16	**Supercedes Date:**	11/20/15

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Safety Data Sheet

classification according to Canadian Hazardous Products Regulation

WINDEX® AUTO GLASS & INTERIOR

Version 1.0 | Print Date 06/20/2017

Revision Date 05/24/2017 | SDS Number 350000017346

1. PRODUCT AND COMPANY IDENTIFICATION

Product information

Product name	:	WINDEX® AUTO GLASS & INTERIOR
Recommended use	:	Experimental FormulaHard Surface Cleaner
Restrictions on use	:	Use only as directed on label
Manufacturer, importer, supplier	:	S.C. Johnson and Son, Limited 1 Webster Street Brantford ON N3T 5R1
Telephone	:	+1-800-558-5566
Emergency telephone number	:	24 Hour Transport & Medical Emergency Phone (866) 231-5406 24 Hour International Emergency Phone (952) 852-4647 24 Hour Canadian Transport Emergency Phone (CANUTEC) (613) 996-6666

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System (GHS) Classification
This product does not meet the criteria for classification in any hazard class according to the Canadian Hazardous Products Regulation

Labelling

Precautionary statements

Other hazards : None identified

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous chemicals present at or above reportable levels as defined by Canadian Hazardous Products Regulation are listed in this table.

Chemical name	CAS-No.	Weight percent
Ethyleneglycol Monohexylether	112-25-4	1.00 - 1.50
Lactic Acid	79-33-4	0.0001 - 0.10

The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

For additional information on product ingredients, see www.whatsinsidescjohnson.com.

4. FIRST AID MEASURES

Description of first aid measures

Eye contact : No special requirements

Skin contact : No special requirements

Inhalation : No special requirements.

Ingestion : No special requirements

Most important symptoms and effects, both acute and delayed

Eyes : No adverse effects expected when used as directed.

Skin effect : No adverse effects expected when used as directed.

Inhalation : May cause respiratory tract irritation.

Ingestion : No adverse effects expected when used as directed.

Indication of any immediate medical attention and special treatment needed

See Description of first aid measures unless otherwise stated.

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Specific hazards during firefighting	:	Container may melt and leak in heat of fire.
Further information	:	Fight fire with normal precautions from a reasonable distance. Standard procedure for chemical fires. Wear full protective clothing and positive pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wash thoroughly after handling.
Environmental precautions	:	Outside of normal use, avoid release to the environment.
Methods and materials for containment and cleaning up	:	Dike large spills. Clean residue from spill site.

7. HANDLING AND STORAGE

Handling

Precautions for safe handling	:	Avoid contact with skin, eyes and clothing. For personal protection see section 8. KEEP OUT OF REACH OF CHILDREN AND PETS.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.

Storage

Requirements for storage areas and containers : Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

ACGIH or OSHA exposure limits have not been established for this product or reportable ingredients unless noted in the table above.

Personal protective equipment

Respiratory protection : No special requirements.

Hand protection : No special requirements.

Eye protection : No special requirements.

Skin and body protection : No special requirements.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form : liquid

Color : colourless transparent

Odour : pleasant
vinegar-like

Odour Threshold : Test not applicable for this product type

pH : 3.3

Melting point/freezing point	:	0 C
Initial boiling point and boiling range	:	Test not applicable for this product type
Flash point	:	> 95 °C > 203 °F Method: Tag Closed Cup (TCC)
Evaporation rate	:	Test not applicable for this product type
Flammability (solid, gas)	:	Test not applicable for this product type
Upper/lower flammability or explosive limits	:	Test not applicable for this product type
Vapour pressure	:	Test not applicable for this product type
Vapour density	:	No data available
Relative density	:	1.0 g/ml at 25 °C
Solubility(ies)	:	completely soluble
Partition coefficient: n-octanol/water	:	Test not applicable for this product type
Auto-ignition temperature	:	Test not applicable for this product type
Decomposition temperature	:	Test not applicable for this product type

Viscosity, dynamic	:	Test not applicable for this product type
Viscosity, kinematic	:	Test not applicable for this product type
Oxidizing properties	:	Test not applicable for this product type
Volatile Organic Compounds Total VOC (wt. %)*	:	0.5 % - additional exemptions may apply *as defined by US Federal and State Consumer Product Regulations
Other information	:	None identified

10. STABILITY AND REACTIVITY

Reactivity	:	Do not mix with bleach or any other household cleaners.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Stable under recommended storage conditions.
Conditions to avoid	:	Direct sources of heat.
Incompatible materials	:	None known.
Hazardous decomposition products	:	Thermal decomposition can lead to release of irritating gases and vapours.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity : LD50 > 5000 mg/kg

Acute inhalation toxicity : LC50 > 10 mg/L

Acute dermal toxicity : LD50 > 5000 mg/kg

GHS Properties	Classification	Routes of entry
Acute toxicity	No classification proposed	Oral
Acute toxicity	No classification proposed	Dermal
Acute toxicity	No classification proposed	Inhalation - Dust and Mist
Acute toxicity	No classification proposed	Inhalation - Vapour
Acute toxicity	No classification proposed	Inhalation - Gas
Skin corrosion/irritation	No classification proposed	-
Serious eye damage/eye irritation	No classification proposed	-
Skin sensitisation	No classification proposed	-
Respiratory sensitisation	No classification proposed	-
Germ cell mutagenicity	No classification proposed	-
Carcinogenicity	No classification proposed	-
Reproductive toxicity	No classification proposed	-
Specific target organ toxicity - single exposure	No classification proposed	-

Specific target organ toxicity - repeated exposure	No classification proposed	-
Aspiration hazard	No classification proposed	-

Aggravated Medical Condition : None known.

12. ECOLOGICAL INFORMATION

Product : The product itself has not been tested.

Toxicity
The ingredients in this formula have been reviewed and no adverse impact to the environment is expected when used according to label directions.

Toxicity to fish

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test LC50	Pimephales promelas (fathead minnow)	140 mg/l	96 h
Lactic Acid	static test LC50	Oncorhynchus mykiss (rainbow trout)	100 - 180 mg/l	96 h

Toxicity to aquatic invertebrates

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test EC50	Daphnia magna (Water flea)	145 mg/l	48 h

Lactic Acid	static test EC50	Daphnia magna (Water flea)	130 mg/l	48 h

Toxicity to aquatic plants

Components	End point	Species	Value	Exposure time
Ethyleneglycol Monohexylether	static test EC50	Desmodesmus subspicatus (green algae)	147.128 mg/l	96 h
Lactic Acid	static test EC50	Pseudokirchneriella subcapitata (green algae)	> 2,800 mg/l	72 h

Persistence and degradability

Component	Biodegradation	Exposure time	Summary
Ethyleneglycol Monohexylether	96.8 %	20 d	Readily biodegradable.
Lactic Acid	67 %	20 d	

Bioaccumulative potential

Component	Bioconcentration factor (BCF)	Partition Coefficient n-Octanol/water (log)
Ethyleneglycol Monohexylether	5.8 estimated	1.97
Lactic Acid	No data available	-0.62

Mobility

Component	End point	Value
Ethyleneglycol Monohexylether	Koc	10 estimated
Lactic Acid	log Koc	< 1.32

PBT and vPvB assessment

Component	Results
Ethyleneglycol Monohexylether	Not fulfilling PBT and vPvB criteria
Lactic Acid	Not fulfilling PBT and vPvB criteria

Other adverse effects : None known.

13. DISPOSAL CONSIDERATIONS

Consumer may discard empty container in trash, or recycle where facilities exist.

14. TRANSPORT INFORMATION

Please refer to the Bill of Lading/receiving documents for up-to-date shipping information.

Land transport
Not classified as dangerous in the meaning of transport regulations.

Sea transport
Not classified as dangerous in the meaning of transport regulations.

Air transport
Not classified as dangerous in the meaning of transport regulations.

15. REGULATORY INFORMATION

Notification status : All ingredients of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

Notification status	:	All ingredients of this product comply with the New Substances Notification requirements under the Canadian Environmental Protection Act (CEPA).
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Canada Regulations	:	This product has been classified in accordance with the hazard criteria of the Hazardous Products Act and Regulations.

16. OTHER INFORMATION

HMIS Ratings

Health	0
Flammability	1
Reactivity	0

NFPA Ratings

Health	0
Fire	1
Reactivity	0
Special	-

This information is being provided in accordance with Canada's Workplace Hazard Material Information System. The information supplied is designed for workplaces where product use and frequency of exposure exceeds that established for the labeled consumer use.

Further information

WINDEX® AUTO GLASS & INTERIOR

Version 1.0

Print Date 06/20/2017

Revision Date 05/24/2017

SDS Number 350000017346

This document has been prepared using data from sources considered to be technically reliable. It does not constitute a warranty, expressed or implied, as to the accuracy of the information contained herein. Actual conditions of use are beyond the seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Prepared by	SC Johnson Global Safety Assessment & Regulatory Affairs (GSARA)

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: WYPALL* Waterless Cleaning Wipes, SCOTT* PRO Heavy Duty Cleaning Wipes

Product Number: 58028-04, 58310-04, 91054-04, 91367-04, 91371-04

Date Prepared:	2/10/2014
Manufacturer:	Kimberly-Clark Corporation 2100 Winchester Road Neenah, WI 54956 United States of America
Telephone: MEDICAL EMERGENCY TRANSPORTATION EMERGENCY INFORMATION	 1-877-561-6587 Chemtrec 1-800-424-9300 1-888-346-4652 For additional information contact: kcpinfo@kcc.com.

Product Use: Skin/personal cleansing

2. HAZARDS IDENTIFICATION

White liquid with a citrus odor on a polypropylene towel.

Emergency Overview: May cause eye irritation.

EU Classification (1999/45/EC): Not classified as a dangerous substance or preparation.

US OSHA Classification (29CFR1910.1200): Eye Irritant.

Canadian WHMIS Classification: Drugs and cosmetics are not subject to the Hazardous Products Act (WHMIS).

GHS Classification:
Not Hazardous

GHS Labeling: None required.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	*CAS-No./ EINECS-No*	*%*	*EU Classification (67/548/EEC):*
Dipropylene Glycol n-Butyl Ether	29911-28-2 / 249-951-5	1-5%	Not Hazardous
C 9-11 Pareth-6	68439-46-3	3%	Xi R36

Non-Hazardous Ingredients	Proprietary	92-96%	Not applicable

See Section 16 for further information on EU Classification.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. Seek medical advice if cough, shortness of breath or other respiratory problems occur.

Skin contact: This product is intended for use on the skin. Seek medical advice if redness, swelling, itching or burning occurs.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention if irritation persists.

Ingestion: Call a physician or Poison Control Centre immediately. If victim is conscious, rinse mouth with a small amount of water. Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Use media suitable for surrounding materials.

Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective suit.

Unusual Fire and Explosion Hazards: None currently known.

Hazardous Combustion Products: Carbon monoxide, carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Pick up and place in a suitable container for use or disposal. Comply with all federal, state and local regulations.

7. HANDLING AND STORAGE

Avoid contact with eyes.

Recommended storage temperature <104ºF (40ºC).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Chemical Name	Exposure limit(s)
Dipropylene Glycol n-Butyl Ether	10 mg/m3 TWA (manufacturer recommended)
C 9-11 Pareth-6	None established

Ventilation: No special ventilation normally required.

Respiratory Protection: No personal respiratory protective equipment normally required.

Protective Gloves: Not required. This product is intended for use as a hand cleanser and is expected to contact the skin.

Eye Protection: None required for normal use.

For bulk processing, regular hand washing along with general body-covering clothing, safety goggles and gloves are recommended as good industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	White liquid with a citrus odor on a polypropylene towel.
Boiling point/range	>212ºF (100ºC)
Melting point/range	Not applicable
Specific Gravity (water=1)	Not available
Vapor pressure	Not available
Vapor density (air=1)	Not available
Solubility	Moderate
pH	4.75
Partition coefficient (n-octanol/water):	Not available
Evaporation Rate (Butyl acetate=1)	Not available
Percent Volatile by Volume (%)	80-90%
Volatile Organic Carbon Compounds (VOC) (g/L)	Not available
Flashpoint:	>200ºF (93.3ºC)
Flammable Limits in Air % by Volume:	LEL (Lower):0.6% UEL (Upper): 20.4%

10. STABILITY AND REACTIVITY

Stability: Stable

Conditions to Avoid: Avoid freezing or excessive heat.

Materials to avoid: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Does not occur.

11. TOXICOLOGICAL INFORMATION

Symptoms/Effects of Overexposure:

Inhalation: None expected.

Skin contact: Prolonged skin contact may cause mild irritation in sensitive individuals.

Eye contact: Contact with eyes may cause irritation.

Ingestion: May cause mucous membrane and gastrointestinal irritation and other adverse effects.

Chronic toxicity: None currently known.

Medical Conditions Aggravated by Exposure: None currently known. May possibly aggravate dermatitis, psoriasis and other skin conditions.

Carcinogenicity Data: None of the components of this product is listed as a carcinogen by IARC, NTP, US OSHA or the EU CLP Annex VI.

Reproductive Toxicity: No adverse effects on reproduction are known.

Acute Toxicity Values: Product: Oral LD50 (rat) >5000 mg/kg Based on an assessment of the ingredients.

12. ECOLOGICAL INFORMATION

No data is currently available.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all state, local and federal regulations.

14. TRANSPORT INFORMATION

US DOT Shipping Description: Not regulated

IATA Shipping Description (Air): Not regulated

IMDG Shipping Description (Vessel): Not regulated

15. REGULATORY INFORMATION

US Regulations

EPA Toxic Substances Control Act (TSCA): All of the components of this product are listed on the TSCA Inventory or exempted from TSCA.

SARA 302 Listed Chemicals: None.

SARA 311/312 Hazard Categories: Acute Health

SARA 313 This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under the SARA Section 313 (40 CFR 372): None.

California Proposition 65: This product does not contain chemicals listed per the Safe Drinking Water and Toxic Enforcement Act of 1986.

International Regulations

Canadian CEPA: All of the components are either listed on or exempted from the Domestic Substances List (DSL).

Canadian WHMIS Classification: Drugs and cosmetics are not subject to the Hazardous Products Act (WHMIS).

EU Labeling: Medicinal and cosmetic products in the finished form, intended for the final user are not subject to the Directive relating to the classification, packaging and labelling of dangerous preparations (1999/45/EC).

16. OTHER INFORMATION

HMIS Rating: Health 1 Fire 1 Physical Hazard 0

NFPA Rating: Health 1 Fire 1 Instability 0

0 = Minimal Hazard, 1 = Slight Hazard, 2 = Moderate Hazard, 3 = Serious Hazard, 4 = Severe Hazard

EU Classes and Risk Phrases for Reference (See Sections 2 and 3):
Xi - Irritant

R36 - Irritating to eyes.

The information contained herein is true and correct to the best of Kimberly-Clark's knowledge. However, no warranty, expressed or implied, is made. Nothing herein should be interpreted as a recommendation to infringe existing patents or violate any laws or regulations. Final determination of the suitability of the material is the sole responsibility of the user.

Acetylene, dissolved

Safety Data Sheet P-4559

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 10/13/2016 Supersedes: 02/03/2016

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Acetylene, dissolved
CAS No	:	74-86-2
Formula	:	C2H2
Other means of identification	:	Acetylen, ethine, ethyne, narcylene

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Gas 1 H220
Dissolved gas H280

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS02 GHS04

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) : H220 - **EXTREMELY FLAMMABLE GAS**
H231 - MAY REACT EXPLOSIVELY EVEN IN THE ABSENCE OF AIR AT ELEVATED PRESSURE AND/OR TEMPERATURE
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR

Precautionary statements (GHS-US) : P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P271+P403 - Use and store only outdoors or in a well-ventilated place
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P501 - Dispose of contents/container in accordance with container Supplier/owner instructions
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG13 - Fusible plugs in the top, bottom, or valve melt at 98 °C to 107 °C (208 °F to 224 °F). Do not discharge at pressures above 15 psig (103 kPa)

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CGA-PG06 - Close valve after each use and when empty
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

2.3. Other hazards

Other hazards not contributing to the classification : For safety reasons, the acetylene is dissolved in acetone (CAS # 67-64-1; Flam. Liq. 2, Eye Irrit. 2, STOT SE 3) in the gas container. Vapor of the solvent is carried away as impurity when the acetylene is extracted from the gas container. The concentration of the solvent vapor in the gas is lower than the concentration limits to change the classification of the acetylene.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Acetylene, dissolved (Main constituent)	(CAS No) 74-86-2	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.. Get immediate medical attention.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : See below. See CGA Pamphlet SB-4, *Handling Acetylene Cylinders in Fire Situations,* for further information.

5.2. Special hazards arising from the substance or mixture

Fire hazard : **EXTREMELY FLAMMABLE GAS**. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : **EXTREMELY FLAMMABLE GAS**. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

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5.3. Advice for firefighters

Firefighting instructions	:	Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
Protection during firefighting	:	Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.
Special protective equipment for fire fighters	:	Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Specific methods	:	Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems Stop flow of product if safe to do so Use water spray or fog to knock down fire fumes if possible Continue water spray from protected position until container stays cool.
Other information	:	Acetylene containers are provided with pressure relief devices designed to vent contents when exposed to elevated temperature.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Evacuate area. Ensure adequate ventilation. Stop leak if safe to do so.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post “No Smoking/No Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

Storage area : Acetylene trailers are designed and intended for outdoor use. Acetylene storage in excess of 2.500 cu ft (70.79 cubic meters) is prohibited in buildings and other occupancies.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Acetylene, dissolved (74-86-2)	
ACGIH	Not established
USA OSHA	Not established

8.2. Exposure controls

Appropriate engineering controls : An explosion-proof local exhaust system or a mechanical system is acceptable if it can prevent oxygen deficiency and keep hazardous fumes and gases below all applicable exposure limits in the worker's breathing area. During welding, ensure that there is adequate ventilation to keep worker exposure below applicable limits for fumes, gases, and other by-products of welding. Do not breathe fumes or gases. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes, or may cause other similar discomfort.

Eye protection : Wear safety glasses with side shields.

Skin and body protection : As needed for welding, wear hand, head, and body protection to help prevent injury from radiation and sparks. (See ANSI Z49.1.) At a minimum, this includes welder’s gloves and protective goggles, and may include arm protectors, aprons, hats, and shoulder protection as well as substantial clothing.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Other information : Consider the use of flame resistant anti-static safety clothing. Wear leather safety gloves and safety shoes when handling cylinders.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

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Appearance	:	Colorless, odorless gas.
Molecular mass	:	26 g/mol
Color	:	Colorless.
Odor	:	Garlic like. Poor warning properties at low concentrations.
Odor threshold	:	No data available
pH	:	Not applicable.
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable.
Melting point	:	-80.8 °C (-113.4°F)
Freezing point	:	No data available
Boiling point	:	-84 °C (-119.2°F)
Flash point	:	-17 °C (1.4°F)
Critical temperature	:	36 °C (97°F)
Auto-ignition temperature	:	305 °C (581°F)
Decomposition temperature	:	635 °C (1175°F)
Flammability (solid, gas)	:	2.5 - 100 vol %
Vapor pressure	:	44 bar (623 psig)
Critical pressure	:	61.38 bar (875 psig)
Relative vapor density at 20 °C	:	No data available
Relative density	:	Not applicable.
Density	:	0.0012 g/cm³ (at 0 °C)
Relative gas density	:	0.9
Solubility	:	Water: 1185 mg/l
Log Pow	:	0.37
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	No data available

9.2. Other information

Sublimation point	:	-83.3 °C
Gas group	:	Dissolved gas

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Dissolved in a solvent supported in a porous mass. Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of hazardous reactions

May react explosively even in the absence of air. May decompose violently at high temperature and/or pressure or in the presence of a catalyst. Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid

High temperature. High pressure. Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

Forms explosive acetylides with copper, silver and mercury. Do not use alloys containing more than 65% copper. Air, Oxidizer. Do not use alloys containing more than 43% silver.

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10.6. Hazardous decomposition products

Thermal decomposition or burning may produce carbon monoxide, carbon dioxide, and hydrogen. The welding and cutting process may form reaction products such as carbon monoxide and carbon dioxide. Other decomposition products of normal operation originate from the volatilization, reaction, or oxidation of the material being worked.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Acetylene, dissolved (74-86-2)	
Persistence and degradability	Will rapidly degrade by indirect photolysis in air. Will not undergo hydrolysis.

12.3. Bioaccumulative potential

Acetylene, dissolved (74-86-2)	
Log Pow	0.37
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Acetylene, dissolved (74-86-2)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : No known effects from this product

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

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SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1001 Acetylene, dissolved, 2.1

UN-No.(DOT) : UN1001

Proper Shipping Name (DOT) : Acetylene, dissolved

Hazard labels (DOT) : 2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102) : N86 - UN pressure receptacles made of aluminum alloy are not authorized
N88 - Any metal part of a UN pressure receptacle in contact with the contents may not contain more than 65% copper, with a tolerance of 1%

Additional information

Emergency Response Guide (ERG) Number : 116 (UN1001)

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1001

Proper Shipping Name (IMDG) : Acetylene, dissolved

Class (IMDG) : 2 - Gases

MFAG-No : 116

Air transport

UN-No. (IATA) : 1001

Proper Shipping Name (IATA) : Acetylene, dissolved

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Acetylene, dissolved (74-86-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Reactive hazard Fire hazard

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

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15.2. International regulations

CANADA

Acetylene, dissolved (74-86-2)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Acetylene, dissolved (74-86-2)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Acetylene, dissolved (74-86-2)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on CICR (Turkish Inventory and Control of Chemicals)

15.3. US State regulations

Acetylene, dissolved(74-86-2)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

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SECTION 16: Other information

Other information : When using this product in welding and cutting, read and understand the manufacturer's instructions and the precautionary label on the product. Ask your welding products supplier for a copy of Praxair's free safety booklet, P-2035, Precautions and Safe Practices for Gas Welding, Cutting, and Heating, and for other manufacturers' safety publications. For a detailed treatment, get ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, published by the American Welding Society (AWS), www.aws.org. Order AWS documents from Global Engineering Documents, global.ihs.com. Arcs and sparks can ignite combustible materials. Prevent fires. Refer to NFPA 51B, Standard for Fire Prevention During Welding, Cutting, and Other Hotwork. Do not strike an arc on the container. The defect produced by an arc burn may lead to container rupture

Fumes and gases produced during welding and cutting processes can be dangerous to your health and may cause serious lung disease. KEEP YOUR HEAD OUT OF FUMES. DO NOT BREATHE FUMES AND GASES. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes; or may cause other similar discomfort. Contaminants in the air may add to the hazard of fumes and gases

When you mix two or more chemicals, you can 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 evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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

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

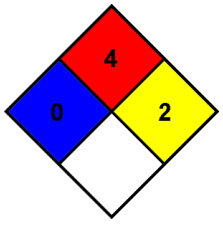
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NFPA health hazard : 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.



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HMIS III Rating

Health	: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability	: 4 Severe Hazard
Physical	: 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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PURITAN PRODUCTS

Effective Date: 01/11/16
Replaces Revision: 01/01/13, 09/08/09

NON-EMERGENCY TELEPHONE
610-866-4225

24-HOUR CHEMTREC EMERGENCY TELEPHONE
800-424-9300

SDS – SAFETY DATA SHEET

1. Identification

Product Identifier: SODIUM HYDROXIDE
Synonyms: Caustic Soda, Lye, Sodium Hydroxide Solid; Sodium Hydrate
Chemical Formula: NaOH
Recommended Use of the Chemical and Restrictions On Use: Laboratory Reagent
Manufacturer / Supplier: Puritan Products; 2290 Avenue A, Bethlehem, PA 18017 **Phone:** 610-866-4225
Emergency Phone Number: 24-Hour Chemtrec Emergency Telephone 800-424-9300

2. Hazard(s) Identification

Classification of the Substance or Mixture:
Skin corrosion (Category 1A)
Serious eye damage (Category 1)
Acute aquatic toxicity (Category 3)

Risk Phrases:
Symbol: C
R35: Causes severe burns.

Label Elements:

Trade Name: SODIUM HYDROXIDE

Signal Word: Danger



Hazard Statements:
H314: Causes severe skin burns and eye damage.
H402: Harmful to aquatic life.

Precautionary Statements:
P280: Wear protective gloves / protective clothing / eye protection/ face protection.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor / physician.

3. Composition / Information on Ingredients

CAS Number: 1310-73-2
EC Number: 215-185-5
Index Number: 011-002-00-6
Molecular Weight: 40 g/mol

Ingredient	CAS Number	EC Number	Percent	Hazardous	Chemical Characterization
Sodium Hydroxide	1310-73-2	215-185-5	99 - 100%	Yes	Substance

4. First-aid Measures

In all cases, immediately call a POISON CENTER or doctor/ physician.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give Oxygen. Call a physician immediately.

Ingestion: DO NOT INDUCE VOMITING! Give large quantities of water or milk, if available. Never give anything by mouth to an unconscious person. Call a physician 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. Call a physician immediately.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

5. Fire-fighting Measures

Fire: Not considered to be a fire hazard. Hot or molten material can react violently with water. Can react with certain metals, such as aluminum, to generate flammable Hydrogen gas.

Explosion: Not considered to be an explosion hazard.

Fire Extinguishing Media: Use any means suitable for extinguishing surrounding fire. CAUTION: Adding water to caustic solution generates large amounts of heat.

Special Information: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering.

Environmental Precautions and Methods and Materials for Containment and Cleaning Up: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Precautions for Safe Handling and Conditions for Safe Storage, Including Any Incompatibilities: Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

8. Exposure Controls / Personal Protection

Airborne Exposure Limits:
OSHA Permissible Exposure Limit (PEL) - 2 mg/m3 Ceiling
ACGIH Threshold Limit Value (TLV) - 2 mg/m3 Ceiling

Ventilation System: A system of local and / or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not feasible, a half face piece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full face piece particulate respirator (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, Glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in Oxygen-deficient atmospheres.

Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection: Use chemical safety goggles and / or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance: White, deliquescent pellets or flakes
Odor: Odorless
Odor Threshold: Not determined
pH: 13 - 14 (0.5% solution)
% Volatiles by volume @ 21C (70F): 0
Melting Point: 318C (604F)
Boiling Point / Boiling Range: 1390C (2534F)
Flash Point: Not applicable
Evaporation Rate (BuAC=1): Not determined
Flammability: Not applicable
Upper / Lower Flammability or Explosive Limits: Not applicable
Vapor Pressure (mm Hg): Negligible
Vapor Density (Air=1): > 1.0
Relative Density: No data available
Solubility: 111 g/100 g of water
Partition Coefficient: n-octanol / water: No data available
Auto-ignition Temperature: No data available
Decomposition Temperature: No data available
Viscosity: No data available

10. Stability and Reactivity

Reactivity and / or Chemical Stability: Stable under ordinary conditions of use and storage. Very hygroscopic. Can slowly pick up moisture from air and react with Carbon Dioxide from air to form Sodium Carbonate.

Possibility of Hazardous Reactions and Conditions to Avoid: Moisture, dusting and incompatibles.

Incompatible Materials: Sodium Hydroxide in contact with acids and organic halogen compounds, especially Trichloroethylene, may causes violent reactions. Contact with Nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as Aluminum, Magnesium, Tin, and Zinc cause formation of flammable Hydrogen gas. Sodium Hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce Carbon Monoxide. Precautions should be taken including monitoring the tank atmosphere for Carbon Monoxide to ensure safety of personnel before vessel entry.

Hazardous Decomposition Products: Sodium Oxide. Decomposition by reaction with certain metals releases flammable and explosive Hydrogen gas.

11. Toxicological Information

Emergency Overview: POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

Potential Health Effects:

Inhalation: Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.

Ingestion: Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appears days after exposure

Skin Contact: Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.

Eye Contact: Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.

Chronic Exposure: Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.

Aggravation of Pre-existing Conditions: Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

Specific Target Organ Toxicity - Single Exposure (Globally Harmonized System:) No data available.

Specific Target Organ Toxicity - Repeated Exposure (Globally Harmonized System:) No data available.

Numerical Measures of Toxicity: Cancer Lists: NTP Carcinogen

Ingredient	Known	Anticipated	IARC Category
Sodium Hydroxide (1310-73-2)	No	No	None

Acute Toxicity:
Sodium hydroxide: irritation data: skin, rabbit: 500 mg / 24 h severe; eye rabbit: 50 ug / 24 h severe
Investigated as a mutagen.

12. Ecological Information

Ecotoxicity: Harmful to aquatic life. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.
EC50 Water flea (Ceriodaphnia dubia): 34.59 mg/l 48 h
LC50 Western mosquitofish (Gambusia affinis): 125 mg/l 96 h

Persistence and Degradability: Expected to readily biodegrade.

Bioaccumulative Potential: No further relevant information available.

Mobility in Soil: During movement through soil some ion exchange will occur. Also, some of the Hydroxide may remain in the aqueous phase and will move downward through soil in the direction of groundwater flow.

Other adverse effects:
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

UN Number: UN1823
UN Proper Shipping Name: SODIUM HYDROXIDE, SOLID
Packing Group: II



DOT **IMDG** **IATA**

Land Transport ADR/RID and GGVS/GGVE (Cross Border / Domestic)
Transport Hazard Class(es): 8

Maritime Transport IMDG/GGVSea
Transport Hazard Class(es): 8
Marine Pollutant: No

Air Transport ICAO-TI and IATA-DGR
Transport Hazard Class(es): 8

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Special Precautions for User: Warning: Corrosive Substances

15. Regulatory Information

Chemical Inventory Status – Part 1

Ingredient	TSCA	EC	Japan	Australia
Sodium Hydroxide (1310-73-2)	Yes	Yes	Yes	Yes

Chemical Inventory Status – Part 2

Ingredient	Korea	Canada		Phil.
		DSL	NDSL	
Sodium Hydroxide (1310-73-2)	Yes	Yes	No	Yes

Federal, State & International Regulations - Part 1

	SARA 302		SARA 313	
Ingredient	RQ	TPQ	List Chemical	Catg.
Sodium Hydroxide (1310-73-2)	No	No	No	No

Federal, State & International Regulations - Part 2

	RCRA		TSCA
Ingredient	CERCLA	261.33	8(d)
Sodium Hydroxide (1310-73-2)	1000	No	No

Chemical Weapons Convention: No		**TSCA 12(b):** No		**CDTA:** Yes
SARA 311/312:	**Acute:** Yes	**Chronic:** Yes	**Fire:** No	**Pressure**: No
Reactivity: Yes		Mixture / Liquid		

Australian Hazchem Code: 2R

Poison Schedule: S6

16. Other Information

THE INFORMATION CONTAINED IN THIS DATA SHEET IS BASED ON THE DATA AVAILABLE TO PURITAN PRODUCTS AT THIS TIME. WHILE BELIEVED TO BE ACCURATE, PURITAN PRODUCTS DOES NOT CLAIM IT TO BE ALL INCLUSIVE. IT IS PROVIDED INDEPENDENT OF ANY SALE OF THE PRODUCT, FOR THE PURPOSE OF HAZARD COMMUNICATION, AND AS A GUIDE FOR THE APPROPRIATE PRECAUTIONARY HANDLING OF THE PRODUCT BY PROPERLY TRAINED INDIVIDUALS. IT IS NOT INTENDED TO PROVIDE PRODUCT PERFORMANCE OR APPLICABILITY INFORMATION, AND NO EXPRESS OR IMPLIED WARRANTY OF ANY KIND IS MADE WITH RESPECT TO THE PRODUCT, THE UNDERLYING PRODUCT DATA, OR THE INFORMATION CONTAINED HEREIN.

YOU ARE URGED TO OBTAIN MATERIAL SAFETY DATA SHEETS FOR ALL PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE, AND ARE ENCOURAGED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED THEREIN.

TO DETERMINE THE APPLICABILITY OR EFFECT OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, YOU SHOULD CONSULT WITH YOUR LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. WE WILL NOT PROVIDE ADVICE ON SUCH MATTERS, OR BE RESPONSIBLE FOR ANY INJURY OR DAMAGE RESULTING FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.

Hydrogen chloride

Safety Data Sheet P-4606

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1984 Revision date: 10/17/2016 Supersedes: 03/19/2015

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Hydrogen chloride
CAS No	:	7647-01-0
Formula	:	HCl
Other means of identification	:	Anhydrous hydrochloric acid

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Liquefied gas	H280
Acute Tox. 3 (Inhalation:gas)	H331
Skin Corr. 1A	H314
Eye Dam. 1	H318

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS04 GHS05 GHS06

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE
H331 - TOXIC IF INHALED
CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P261 - Avoid breathing gas
P262 - Do not get in eyes, on skin, or on clothing
P271+P403 - Use and store only outdoors or in a well-ventilated place
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection
P405 - Store locked up
P501 - Dispose of contents/container Dispose in a safe manner in accordance with local/national regulations

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CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG06 - Close valve after each use and when empty
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Hydrogen chloride (Main constituent)	(CAS No) 7647-01-0	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.

First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Does not burn. Use extinguishing agents compatible with acid and appropriate for the burning material.

5.2. Special hazards arising from the substance or mixture

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER! Toxic, corrosive, liquefied gas.**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

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Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Toxic. Corrosive.** Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Evacuate personnel to a safe area. Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrogen chloride (7647-01-0)		
ACGIH	ACGIH TLV-C (ppm)	2 ppm
USA OSHA	OSHA PEL (Ceiling) (mg/m³)	7 mg/m³
USA OSHA	OSHA PEL (Ceiling) (ppm)	5 ppm
USA IDLH	US IDLH (ppm)	50 ppm
ACGIH	Not established	

8.2. Exposure controls

Appropriate engineering controls : Use a corrosion-resistant local exhaust ventilation system with sufficient air flow velocity to maintain concentration below all applicable exposure limits in the worker's breathing zone. A canopy-type, forced-draft fume hood is preferred.

Hand protection : Neoprene rubber (HNBR) /.

Eye protection : Provide readily accessible eye wash stations and safety showers. Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Colorless gas.

Molecular mass : 36.5 g/mol

Color : Colorless. Gives off white fumes in moist air.

Odor : Pungent.

Odor threshold : No data available

pH : Not applicable.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable.

Melting point : -114 °C

Freezing point : No data available

Boiling point : -85 °C

Flash point : Not applicable.

Critical temperature : 51.4 °C

Auto-ignition temperature : Not applicable.

Decomposition temperature : No data available

Flammability (solid, gas) : Not Applicable

Vapor pressure : 4260 kPa

Critical pressure : 8310 kPa

Relative vapor density at 20 °C : No data available

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Relative density	:	1.2
Density	:	1.161 - 1.19 g/cm³ (at 20 °C)
Relative gas density	:	1.3
Solubility	:	Water: 720000 mg/l
Log Pow	:	Not applicable.
Log Kow	:	Not applicable.
Viscosity, kinematic	:	0.092 cSt Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	Non flammable.

9.2. Other information

Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

Most common metals and their alloys. Bases. unsaturated organics. metal carbides. Fluorine. metal acetylides. potassium permanganate. sulfuric acid.

10.6. Hazardous decomposition products

Hydrogen. Chlorine. Chlorides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: TOXIC IF INHALED.

Hydrogen chloride (\f)7647-01-0	
LD50 oral rat	238 - 277 mg/kg
LD50 dermal rabbit	> 5010 mg/kg
LC50 inhalation rat (ppm)	3120 ppm/1h
ATE US (oral)	238.000 mg/kg body weight
ATE US (gases)	1560.000 ppmV/4h

Skin corrosion/irritation : CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.

pH: Not applicable.

Serious eye damage/irritation : CAUSES SERIOUS EYE DAMAGE.

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

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Hydrogen chloride (7647-01-0)	
IARC group	3 - Not classifiable

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Hydrogen chloride (7647-01-0)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Hydrogen chloride (7647-01-0)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Hydrogen chloride (7647-01-0)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1050 Hydrogen chloride, anhydrous, 2.3

UN-No.(DOT) : UN1050

Proper Shipping Name (DOT) : Hydrogen chloride, anhydrous

Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Hazard labels (DOT) : Poison Gas
2.3 - Poison gas
8 - Corrosive



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DOT Special Provisions (49 CFR 172.102)	:	3 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone C (see 173.116(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter N86 - UN pressure receptacles made of aluminum alloy are not authorized N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized

Additional information

Emergency Response Guide (ERG) Number	:	125 (UN1050);157 (UN1789)
Other information	:	No supplementary information available.
Special transport precautions	:	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG)	:	1050
Proper Shipping Name (IMDG)	:	HYDROGEN CHLORIDE, ANHYDROUS
Class (IMDG)	:	2 - Gases
MFAG-No	:	125

Air transport

UN-No. (IATA)	:	1050
Proper Shipping Name (IATA)	:	Hydrogen chloride, anhydrous
Class (IATA)	:	2
Civil Aeronautics Law	:	Gases under pressure/Gases toxic under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen chloride (7647-01-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on the United States SARA Section 302 Subject to reporting requirements of United States SARA Section 313	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA
CERCLA RQ	5000 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	500 lb (gas only)
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Immediate (acute) health hazard Sudden release of pressure hazard
SARA Section 313 - Emission Reporting	1.0 % (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

15.2. International regulations

CANADA

Hydrogen chloride (7647-01-0)
Listed on the Canadian DSL (Domestic Substances List)

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EU-Regulations

Hydrogen chloride (7647-01-0)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Hydrogen chloride (7647-01-0)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Japanese Poisonous and Deleterious Substances Control Law Listed on the Canadian IDL (Ingredient Disclosure List) Listed on INSQ (Mexican National Inventory of Chemical Substances) Listed on CICR (Turkish Inventory and Control of Chemicals)

15.3. US State regulations

Hydrogen chloride(7647-01-0)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : When you mix two or more chemicals, you can 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 evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the 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 SDS 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

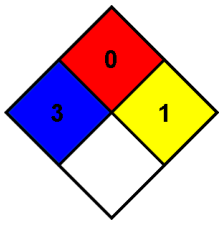
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NFPA health hazard	: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	: 0 - Materials that will not burn.
NFPA reactivity	: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 0 Minimal Hazard
Physical	: 3 Serious Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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SAFETY DATA SHEET

prepared in accordance with Annex II of the REACH Regulation EC 1907/2006, Regulation (EC) 1272/2008 and Regulation (EC) 453/2010.

Version *2.3*

Revision Date 06.06.2016 Print Date 07.10.2016
Date of first issue 28.10.2009

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name	**Calcium oxide**
Synonyms	Quicklime, Lime, Burnt lime, Un-slaked lime, Building lime, Calcia, Fat lime, Chemical lime, Fluxing lime, Hard burnt lime, Soft burnt lime, Pebble lime, Calcium oxide, Calcium monoxide, Quick lime, Calcined limestone. Please note that this list may not be exhaustive.
Trade name	**Milled lime HR Chemistry 0/90µ bulk**
Chemical name - Formula	Calcium oxide - CaO
CAS-No.	1305-78-8
EC-No.	215-138-9
Molecular weight	56,08 g/mol
REACH Registration Number	01-2119475325-36-0071

1.2. Relevant identified uses of the substance or mixture and uses advised against

Find hereunder a general description of uses. All the identified combinations of use descriptors are listed in Table 1 of the Annex.

Manufacture of chemical products
Manufacture of basic metals, including alloys
Agriculture, forestry, fishery
Biocidal product
Environmental protection
Water treatment chemicals
Paper articles
Manufacture of paints, varnishes and similar coatings, printing ink and mastics
Stone, plaster, cement, glass and ceramic articles
Food/ feedstuff additives
Manufacture of food products
Pharmaceuticals
Mining, (including offshore industries)
Manufacture of other non-metallic mineral products, e.g. plasters, cement
Building and construction work

No uses identified in Table 1 of the Annex are advised against.

1.3. Details of the supplier of the safety data sheet	
Company	**Lhoist s.a.**
Address	Usine de On 6900 Marche-en-Famenne Belgium
Telephone	+3210233811
Telefax	+3210233851
E-mail of competent person responsible for SDS in the MS or in the EU:	msds@rheinkalk.de

1.4. Emergency telephone number	
Emergency telephone number (Europe)	**112** ***This telephone number is available 24 hours per day, 7 days per week.***
Poison Information Centre telephone number	+ 31 31 274 88 88 for The Netherlands.
Emergency telephone number (Company)	**+3210233811** ***This telephone number is available during office hours only.***

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

STOT SE3, H335, Exposure: Inhalation
Skin Irrit.2, H315, Exposure: Dermal
Eye Dam.1, H318,

Further information

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2. Label elements

Hazard pictograms



Signal word
Danger

Hazard statements
H315: Causes skin irritation.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.

Precautionary statements
P102: Keep out of reach of children.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor.
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.
P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P501: Dispose of contents/container in accordance with local regulation.

2.3. Other hazards

The substance does not meet the criteria for PBT or vPvB substance.
No other hazards identified.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical name	CAS-No.	EC-No.	REACH No.	Index-No.	Weight percent
Calcium oxide	1305-78-8	215-138-9	01-2119475325-36	—	- <100

Degree of purity (%): No impurities relevant for classification and labelling

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	No known delayed effects. Consult a physician for all exposures except for minor instances.
Inhalation	Move source of dust or move person to fresh air. Obtain medical attention immediately.

Skin contact 	Carefully and gently brush the contaminated body surfaces in order to remove all traces of product. Wash affected area immediately with plenty of water. Remove contaminated clothing. If skin irritation persists, call a physician.
Eye contact 	Rinse immediately with plenty of water and seek medical advice.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Obtain medical attention.

4.2. Most important symptoms and effects, both acute and delayed

The substance is not acutely toxic via the oral, dermal, or inhalation route. The substance is classified as irritating to skin and the respiratory tract, and entails a risk of serious damage to the eye. There is no concern for adverse systemic effects because local effects (pH-effect) are the major health hazard.

4.3. Indication of any immediate medical attention and special treatment needed

Follow the advice given in section 4.1.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	The product is not combustible. Use a dry powder, foam or CO2 fire extinguisher to extinguish the surrounding fire. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	DO NOT use water. Avoid humidification.

5.2. Special hazards arising from the substance or mixture

Calcium oxide reacts with water and generates heat. This may cause risk to flammable material.

5.3. Advice for firefighters

Avoid dust formation.
Use breathing apparatus.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: Accidental release measures	
6.1. Personal precautions, protective equipment and emergency procedures	
6.1.1. Advice for non-emergency personnel	Ensure adequate ventilation. Keep dust levels to a minimum. Keep unprotected persons away. Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8). Avoid inhalation of dust – ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8). Avoid humidification.
6.1.2. Advice for emergency responders	See section 6.1.1
6.2. Environmental precautions	
Contain the spillage. Keep the material dry if possible. Cover area if possible to avoid unnecessary dust hazard. Avoid uncontrolled spills to watercourses and drains (pH rising). Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.	
6.3. Methods and materials for containment and cleaning up	
Avoid dust formation. Keep the material dry if possible. Pick up the product mechanically in a dry way. Use vacuum suction unit, or shovel into bags.	
6.4. Reference to other sections	
For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 and the Annex of the safety data sheet.	
SECTION 7: Handling and storage	
7.1. Precautions for safe handling	
7.1.1. Protective measures	Avoid contact with skin and eyes. For personal protection see section 8. Keep dust levels to a minimum. Minimise dust generation. Enclose dust sources, use exhaust ventilation (dust collector at handling points). Handling systems should preferably be enclosed. When handling bags usual precautions should be paid to the risks outlined in the Council Directive 90/269/EEC.
7.1.2. Advice on general occupational hygiene	Avoid inhalation, ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance.

	These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2. Conditions for safe storage, including any incompatibilities

Store in a dry place.
Minimise exposure to air and moisture to avoid degradation.
Bulk storage should be in purpose designed silos.
Keep out of the reach of children.
Keep away from acids, significant quantities of paper, straw and nitro compounds.
DO NOT use aluminium for transport and storage if there is a risk of contact with water.

7.3. Specific end use(s)

Please check the identified uses in table 1 of the Appendix of this SDS.
For more information please see the relevant exposure scenario, available via your supplier/given in the Appendix, and check section 2.1: Control of worker exposure.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limit

Chemical name	Form	Limit value	Legal basis
Calcium oxide	No data available	No data available	http://www.ser.nl/

Derived No Effect Level

Workers

Chemical name	Exposure routes	Acute local effects	Acute systemic effects	Long-term local effects	Long-term systemic effects
Calcium oxide	Oral	Not required	Not required	Not required	Not required
	Inhalation	4 mg/m3 Respirable dust	No hazard identified	1 mg/m3 Respirable dust	No hazard identified
	Dermal	no exposure expected	No hazard identified	no exposure expected	No hazard identified

Consumers

Chemical name	Exposure routes	Acute local effects	Acute systemic effects	Long-term local effects	Long-term systemic effects
Calcium oxide	Oral	no exposure expected	no exposure expected	no exposure expected	no exposure expected
	Inhalation	4 mg/m3 Respirable dust	No hazard identified	1 mg/m3 Respirable dust	No hazard identified
	Dermal	no exposure expected	no exposure expected	no exposure expected	No hazard identified

Predicted No Effect Concentration

Chemical name	Environmental protection target							
	Fresh water	Fresh water sediment	Marine water	Marine sediment	Food chain	Microorganisms in sewage treatment	Soil	Air
Calcium	0,37 mg/l	No data	0,24 mg/l	No data	Does not	2,27 mg/l	817,4	No data

oxide		available		available	bioaccumulate.		mg/kg soil dw	available

8.2. Exposure controls

To control potential exposures, generation of dust should be avoided. Further, appropriate protective equipment is recommended. Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
Please check the relevant exposure scenario, given in the Appendix/available via your supplier.

8.2.1. Appropriate engineering controls	Handling systems should preferably be enclosed or suitable ventilation installed to maintain atmospheric dust below the OES, if not wear suitable protective equipment.
8.2.2. Individual protection measures, such as personal protective equipment	
8.2.2.1. Eye/face protection 	Do not wear contact lenses. For powders, tight fitting goggles with side shields, or wide vision full goggles. It is also advisable to have individual pocket eyewash.
8.2.2.2. Skin protection 	Use approved nitrile impregnated gloves having CE marks. Use clothing fully covering skin, full length pants, long sleeved overalls, with close fittings at openings. Footwear resistant to caustics and avoiding dust penetration.
8.2.2.3. Respiratory protection 	Local ventilation to keep levels below established threshold values is recommended. A suitable particle filter mask is recommended, depending on the expected exposure levels - please check the relevant exposure scenario, given in the Appendix/available via your supplier.
8.2.2.4. Thermal hazards	The substance does not represent a thermal hazard, thus special consideration is not required.
8.2.3. Environmental exposure controls	All ventilation systems should be filtered before discharge to atmosphere. Contain the spillage. Keep the material dry if possible. Cover area if possible to avoid unnecessary dust hazard. Avoid uncontrolled spills to watercourses and drains (pH rising). Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body. For more information please see the relevant exposure scenario, available via your supplier/given in the Appendix, and check section 2.1: Control of worker exposure.

SECTION 9: Physical and chemical properties	
9.1. Information on basic physical and chemical properties	
Appearance:	Colour: white, off-white, beige Form: Solid material of varying sizes: lump, granular or fine powder.
Odour:	Odourless
Odour Threshold:	Not applicable
pH:	12,3; 20 °C; saturated solution
Melting point:	> 450 °C; study result, EU A.1 method
Boiling point:	Not applicable (solid with a melting point > 450°C)
Flash point:	Not applicable (solid with a melting point > 450°C)
Evaporation rate:	Not applicable (solid with a melting point > 450°C)
Flammability:	The product is not flammable.; study result, EU A.10 method Lower flammability limit: No data available Upper flammability limit: No data available
Explosive properties:	Non explosive (void of any chemical structures commonly associated with explosive properties). Upper/Lower explosion limit lower: No data available upper: No data available
Vapour pressure:	Not applicable (solid with a melting point > 450°C)
Vapour density:	Not applicable
Relative density:	3,31 g/cm3; study result, EU A.3 method
Bulk density	700 - 1.300 kg/m3; 20 °C
Solubility(ies):	1.337,6 mg/l; study result, EU A.6 method;
Partition coefficient: n-octanol/water:	Not applicable (inorganic substance).
Auto-ignition temperature:	No relative self-ignition temperature below 400°C (study result, EU A.16 method)
Decomposition temperature:	Not applicable
Viscosity, kinematic:	Not applicable (solid with a melting point > 450°C)
Oxidizing properties:	No oxidising properties. (Based on the chemical structure, the substance does not contain a surplus of oxygen or any structural groups known to be correlated with a tendency to react exothermally with combustible material).
9.2. Other information	
No data available	
SECTION 10: Stability and reactivity	
10.1. Reactivity	
Calcium oxide reacts exothermically with water to form calcium dihydroxide.	
10.2. Chemical stability	
Under normal conditions of use and storage (dry conditions), the product is stable.	

10.3. Possibility of hazardous reactions

The product reacts exothermically with acids.

10.4. Conditions to avoid

For information on conditions to avoid, please see section 7.

10.5. Incompatible materials

Calcium oxide reacts exothermically with water to form calcium dihydroxide.
$CaO + H2O \rightarrow Ca(OH)2 + 1155$ kJ/kg CaO
The product reacts exothermically with acids to form salts.
Reacts with aluminium and brass in the presence of moisture leading to the production of hydrogen.
$CaO + 2\ Al + 7\ H2O \rightarrow Ca(Al\ (OH)4)2 + 3\ H2$

10.6. Hazardous decomposition products

none
Further information
Calcium oxide absorbs moisture and carbon dioxide from air to form calcium carbonate, which is a common material in the nature.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity
Oral LD50 > 2000 mg/kg bw (OECD 425, rat)
Dermal LD50 > 2500 mg/kg bw (calcium dihydroxide, OECD 402, rabbit);
by read across these results are also applicable to calcium oxide, since in contact with moisture calcium hydroxide is formed.
Inhalation no data available
Calcium oxide is not acutely toxic.
Classification for acute toxicity is not warranted.

Skin corrosion/irritation
Calcium oxide is irritating to skin (in vivo, rabbit).
Based on experimental results, calcium oxide requires classification as irritating to skin [Skin Irrit 2 (H315 – Causes skin irritation)].

Serious eye damage/eye irritation
Calcium oxide entails a risk of serious damage to the eye (eye irritation studies (in vivo, rabbit).
Based on experimental results, the product requires classification as severely irritating to the eye [Eye Damage 1 (H318 - Causes serious eye damage)].

Respiratory or skin sensitisation
No data available.
The product is considered not to be a skin sensitiser, based on the nature of the effect (pH shift) and the essential requirement of calcium for human nutrition.
Classification for sensitisation is not warranted.

Germ cell mutagenicity
Bacterial reverse mutation assay (Ames test, OECD 471): Negative
In view of the omnipresence and essentiality of Ca and of the physiological non-relevance of any pH shift induced in aqueous media, calcium oxide is obviously void of any genotoxic potential, including germ cell mutagenicity.
Classification for genotoxicity is not warranted.

Carcinogenicity
Calcium (administered as Ca-lactate) is not carcinogenic (experimental result, rat). The pH effect of the product does not give rise to a carcinogenic risk. Human epidemiological data support lack of any carcinogenic potential of the product.
Classification for carcinogenicity is not warranted.

Reproductive toxicity
Calcium (administered as Ca-carbonate) is not toxic to reproduction (experimental result, mouse). The pH effect does not give rise to a reproductive risk.
Human epidemiological data support lack of any potential for reproductive toxicity of the product. Both in animal studies and human clinical studies on various calcium salts no reproductive or developmental effects were detected. Also see the Scientific Committee on Food (Section 16.6).Thus, the product is not toxic for reproduction and/or development.
Classification for reproductive toxicity according to regulation (EC) 1272/2008 is not required.

STOT - single exposure
From human data it is concluded that calcium oxide is irritating to the respiratory tract.
As summarised and evaluated in the SCOEL recommendation (Anonymous, 2008), based on human data calcium oxide is classified as irritating to the respiratory system [STOT SE 3 (H335 – May cause respiratory irritation)].

STOT - repeated exposure
Toxicity of calcium via the oral route is addressed by upper intake levels (UL) for adults determined by the Scientific Committee on Food (SCF), being UL = 2500 mg/d, corresponding to 36 mg/kg bw/d (70 kg person) for calcium.
Toxicity of the product via the dermal route is not considered as relevant in view of the anticipated insignificant absorption through skin and due to local irritation as the primary health effect (pH shift).
Toxicity of the product via inhalation (local effect, irritation of mucous membranes) is addressed by an 8-h TWA determined by the Scientific Committee on Occupational Exposure Limits (SCOEL) of 1 mg/m³ respirable dust (see section 8.1).
Therefore, classification of the product for toxicity upon prolonged exposure is not required.

Aspiration hazard
The product is not known to present an aspiration hazard.

SECTION 12: Ecological information

12.1. Toxicity

12.1.1. Toxicity to fish	LC50 (96h) for freshwater fish: 50.6 mg/l (calcium dihydroxide)

	LC50 (96h) for marine water fish: 457 mg/l (calcium dihydroxide)
12.1.2. Toxicity to aquatic invertebrates	EC50 (48h) for freshwater invertebrates: 49.1 mg/l (calcium dihydroxide) LC50 (96h) for marine water invertebrates: 158 mg/l (calcium dihydroxide)
12.1.3. Toxicity to aquatic plants	EC50 (72h) for freshwater algae: 184.57 mg/l (calcium dihydroxide) NOEC (72h) for freshwater algae: 48 mg/l (calcium dihydroxide)
12.1.4. Toxicity to microorganisms / **Toxicity to bacteria**	At high concentration, through the rise of temperature and pH, the product is used for disinfection of sewage sludge.
12.1.5. Toxicity to daphnia and other aquatic invertebrates	NOEC (14d) for marine water invertebrates: 32mg/l (calcium dihydroxide)
12.1.6. Toxicity to soil dwelling organisms	EC10/LC10 or NOEC for soil macroorganisms: 2000 mg/kg soil dw (calcium dihydroxide) EC10/LC10 or NOEC for soil microorganisms: 12000 mg/kg soil dw (calcium dihydroxide)
12.1.7. Toxicity to terrestrial plants	NOEC (21d) for terrestrial plants: 1080 mg/kg (calcium dihydroxide)
12.1.8. Other effects	Acute pH-effect. Although this product is useful to correct water acidity, an excess of more than 1 g/l may be harmful to aquatic life. pH-value of > 12 will rapidly decrease as result of dilution and carbonation.
12.1.9. Other information	The results by read across are also applicable to calcium oxide, since in contact with moisture calcium hydroxide is formed.

12.2. Persistence and degradability
Not relevant for inorganic substances.
12.3. Bioaccumulative potential
Not relevant for inorganic substances.
12.4. Mobility in soil
Calcium oxide reacts with water and/or carbon dioxide to form respectively calcium dihydroxide and/or calcium carbonate, which are sparingly soluble, and present a low mobility in most soils.
12.5. Results of PBT and vPvB assessment
Not relevant for inorganic substances.
12.6. Other adverse effects
No other adverse effects are identified.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Reuse or recycle whenever possible.
If the reuse or recycling is not possible, disposal must be made according to local and national regulation.
Processing, use or contamination of this product may change the waste management options.
Waste classification code must be determined at the point of waste generation.
Dispose of container and unused contents in accordance with applicable member state and local requirements.
The used packaging is only meant for packing this product; it should not be reused for other purposes.
If the used packaging contains more than 3 % of the lime product, it must be considered as hazardous.

SECTION 14: Transport information

Calcium oxide is not classified as hazardous for transport (ADR (Road), RID (Rail)).

14.1. UN number

UN 1910

14.2. UN proper shipping name

UN 1910, Calcium oxide

14.3. Transport hazard class(es)

Class 8 (IATA_C)
Class 8 (IMDG)
UN number 1910 is listed in IMDG (Amendment 34-08)

14.4. Packing group

Group III (IATA_C)
Group III (IMDG)

14.5. Environmental hazards

None.

14.6. Special precautions for user

Avoid any release of dust during transportation, by using air-tight tanks for powders and covered trucks for pebbles.

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

Not regulated

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations	Not required
Restrictions on use	None
Other regulations (European Union)	The product is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.
National regulatory information	German legislation on water endangering substances VwVwS slightly water endangering (WGK 1)

15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

16.1. Hazard statements

	H315: Causes skin irritation. H318: Causes serious eye damage. H335: May cause respiratory irritation.

16.2. Precautionary statements

	P102: Keep out of reach of children. P280: Wear protective gloves/ protective clothing/ eye protection/ face protection. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER/doctor. P302 + P352: IF ON SKIN: Wash with plenty of soap and water.

	P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P501: Dispose of contents/container in accordance with local regulation.

16.3. Abbreviations

	DNEL: Derived no effect level EC50: median effective concentration LC50: median lethal concentration LD50: median lethal dose NOEC: no observable effect concentration OEL: occupational exposure limit PBT: persistent, bioaccumulative, toxic chemical PNEC: predicted no-effect concentration SDS: Safety data sheet STEL: short-term exposure limit STOT: specific target organ toxicity TWA: time weighted average vPvB: very persistent, very bioaccumulative chemical

16.4. Literary reference

Anonymous, 2006: Tolerable upper intake levels for vitamins and minerals Scientific Committee on Food, European Food Safety Authority, ISBN: 92-9199-014-0 [SCF document]
Anonymous, 2008: Recommendation from the Scientific Committee on Occupational Exposure Limits (SCOEL) for calcium oxide (CaO) and calcium dihydroxide (Ca(OH)2), European Commission, DG Employment, Social Affairs and Equal Opportunities, SCOEL/SUM/137 February 2008

16.5. Additions, Deletions, Revisions

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Disclaimer

This safety data sheet (SDS) is based on the legal provisions of the REACH Regulation (EC 1907/2006; article 31 and Annex II), as amended. Its contents are intended as a guide to the appropriate precautionary handling of the material. It is the responsibility of recipients of this SDS to ensure that the information contained therein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. Information and instructions provided in this SDS are based on the current state of scientific and technical knowledge at the date of issue indicated. It should not be construed as any guarantee of technical performance, suitability for particular applications, and does not establish a legally valid contractual relationship. This version of the SDS supersedes all previous versions.

APPENDIX: EXPOSURE SCENARIOS

The current document includes all relevant occupational and environmental exposure scenarios (ES) for the production and use of calcium oxide as required under the REACH Regulation (Regulation (EC) No 1907/2006). For the development of the ES the Regulation and the relevant REACH Guidance have been considered. For the description of the covered uses and processes, the "R.12 – Use descriptor system" guidance (Version: 2, March 2010, ECHA-2010-G-05-EN), for the description and implementation of risk management measures (RMM) the "R.13 – Risk management measures" guidance (Version: 1.1, May 2008), for the occupational exposure estimation the "R.14 – Occupational exposure estimation" guidance (Version: 2, May 2010, ECHA-2010-G-09-EN) and for the actual environmental exposure assessment the "R.16 – Environmental Exposure Assessment" (Version: 2, May 2010, ECHA-10-G-06-EN) was used.

Methodology used for environmental exposure assessment

The environmental exposure scenarios only address the assessment at the local scale, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, for industrial and professional uses as any effects that might occur is expected to take place on a local scale.

1) Industrial uses (local scale)

The exposure and risk assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions in the industrial stages mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH^- discharges. The exposure assessment for the aquatic environment only deals with the possible pH changes in STP effluent and surface water related to the OH^- discharges at the local scale and is performed by assessing the resulting pH impact: the surface water pH should not increase above 9 (In general, most aquatic organisms can tolerate pH values in the range of 6-9).

Risk management measures related to the environment aim to avoid discharging calcium oxidesolutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. Discharges should be carried out such that pH changes in receiving surface waters are minimised. The effluent pH is normally measured and can be neutralised easily, as often required by national laws.

2) Professional uses (local scale)

The exposure and risk assessment is only relevant for the aquatic and terrestrial environment. The aquatic effect and risk assessment is determined by the pH effect. Nevertheless, the classical risk characterisation ratio (RCR), based on PEC (predicted environmental concentration) and PNEC (predicted no effect concentration) is calculated. The professional uses on a local scale refer to applications on agricultural or urban soil. The environmental exposure is assessed based on data and a modelling tool. The modelling FOCUS/ Exposit tool is used to assess terrestrial and aquatic exposure (typically conceived for biocidal applications).

Details and scaling approach indications are reported in the specific scenarios.

Methodology used for occupational exposure assessment

By definition an exposure scenario (ES) has to describe under which operational conditions (OC) and risk management measure (RMMs) the substance can be handled safely. This is demonstrated if the estimated exposure level is below the respective derived no-effect level (DNEL), which is expressed in the risk characterisation ratio (RCR).

For workers, the repeated dose DNEL for inhalation as well as the acute DNEL for inhalation are based on the respective recommendations of the scientific committee on occupational exposure limits (SCOEL) being 1 mg/m³ and 4 mg/m³, respectively.

In cases where neither measured data nor analogous data are available, occupational exposure is assessed with the aid of a modelling tool. At the first tier screening level, the MEASE tool (http://www.ebrc.de/mease.html) is used to assess inhalation exposure according to the ECHA guidance (R.14).

Since the SCOEL recommendation refers to respirable dust while the exposure estimates in MEASE reflect the inhalable fraction, an additional safety margin is inherently included in the exposure scenarios below when MEASE has been used to derive exposure estimates.

Methodology used for consumer exposure assessment

By definition an ES has to describe under which conditions the substances, preparation or articles can be handled safely. In cases where neither measured data nor analogous data are available, exposure is assessed with the aid of a modelling tool.

For consumers, the repeated dose DNEL for inhalation as well as the acute DNEL for inhalation are based on the respective recommendations of the Scientific Committee on Occupational Exposure Limits (SCOEL), being 1 mg/m³ and 4 mg/m³, respectively.

For inhalation exposure to powders the data, derived from van Hemmen (van Hemmen, 1992: Agricultural pesticide exposure data bases for risk assessment. Rev Environ ContamToxicol. 126: 1-85.), has been used to calculate the inhalation exposure. The inhalation exposure for consumers is estimated at 15 µg/hr or 0.25 µg/min. For larger tasks the inhalation exposure is expected to be higher. A factor of 10 is suggested when the product amount exceeds 2.5 kg, resulting in the inhalation exposure of 150 µg/hr.To convert these values in mg/m³ a default value of 1.25 m³/hr for the breathing volume under light working conditions will be assumed (van Hemmen, 1992) giving 12 µg/m³ for small tasks and 120 µg/m³ for larger tasks.

When the preparation or substance is applied in granular form or as tablets, reduced exposure to dust was assumed. To take this into account if data about particle size distribution and attrition of the granule are lacking, the model for powder formulations is used, assuming a reduction in dust formation by 10 % according to Becks and Falks (Manual for the authorisation of pesticides. Plant protection products. Chapter 4 Human toxicology; risk operator, worker and bystander, version 1.0., 2006).

For dermal exposure and exposure to the eye a qualitative approach has been followed, as no DNEL could be derived for this route due to the irritating properties of calcium oxide. Oral exposure was not assessed as this is not a foreseeable route of exposure regarding the uses addressed.

Since the SCOEL recommendation refers to respirable dust while the exposure estimates by the model from van Hemmen reflect the inhalable fraction, an additional safety margin is inherently included in the exposure scenarios below, i.e. the exposure estimates are very conservative.

The exposure assessment of calcium oxide professional and industrial and consumer use is performed and organized based on several scenarios. An overview of the scenarios and the coverage of substance life cycle is presented in Table 1.

Table 1: Overview on exposure scenarios and coverage of substance life cycle

ES number	Exposure scenario title	Manufacture	Identified uses			Resulting life cycle stage	Linked to Identified Use	Sector of use category (SU)	Chemical Product Category (PC)	Process category (PROC)	Article category (AC)	Environmental release category (ERC)
			Formulation	End use	Consumer	Service life (for articles)						
9.1	Manufacture and industrial uses of aqueous solutions of lime substances	X	X	X		X	1	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.2	Manufacture and industrial uses of low dusty solids/powders of lime substances	X	X	X		X	2	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.3	Manufacture and industrial uses of medium dusty solids/powders of lime substances	X	X	X		X	3	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b

ES number	Exposure scenario title	Manufacture	Identified uses			Resulting life cycle stage	Linked to Identified Use	Sector of use category (SU)	Chemical Product Category (PC)	Process category (PROC)	Article category (AC)	Environmental release category (ERC)
			Formulation	End use	Consumer	Service life (for articles)						
9.4	Manufacture and industrial uses of high dusty solids/powders of lime substances	X	X	X		X	4	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 11a
9.5	Manufacture and industrial uses of massive objects containing lime substances	X	X	X		X	5	3; 1, 2a, 2b, 4, 5, 6a, 6b, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	6, 14, 21, 22, 23, 24, 25	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 7, 12a, 12b, 10a, 10b, 11a, 11b
9.6	Professional uses of aqueous solutions of lime substances		X	X		X	6	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 12, 13, 15, 16, 17, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f
9.7	Professional uses of low dusty solids/powders of lime substances		X	X		X	7	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 21, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f

ES number	Exposure scenario title	Manufacture	Identified uses			Resulting life cycle stage	Linked to Identified Use	Sector of use category (SU)	Chemical Product Category (PC)	Process category (PROC)	Article category (AC)	Environmental release category (ERC)
			Formulation	End use	Consumer	Service life (for articles)						
9.8	Professional uses of medium dusty solids/powders of lime substances		X	X		X	8	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f, 9a, 9b
9.9	Professional uses of high dusty solids/powders of lime substances		X	X		X	9	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24	1, 2, 3, 7, 8, 9a, 9b, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	2, 3, 4, 5, 8a, 8b, 9, 10, 13, 15, 16, 17, 18, 19, 25, 26	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	2, 8a, 8b, 8c, 8d, 8e, 8f
9.10	Professional use of lime substances in soil treatment		X	X			10	22	9b	5, 8b, 11, 26		2, 8a, 8b, 8c, 8d, 8e, 8f
9.11	Professional uses of articles/containers containing lime substances			X		X	11	22; 1, 5, 6a, 6b, 7, 10, 11, 12, 13, 16, 17, 18, 19, 20, 23, 24		0, 21, 24, 25	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 13	10a, 11a, 11b, 12a, 12b

ES number	Exposure scenario title	Manufacture	Identified uses			Resulting life cycle stage	Linked to Identified Use	Sector of use category (SU)	Chemical Product Category (PC)	Process category (PROC)	Article category (AC)	Environmental release category (ERC)
			Formulation	End use	Consumer	Service life (for articles)						
9.12	Consumer use of building and construction material (DIY)				X		X	21	9b, 9a			8
9.13	Consumer use of CO_2 absorbent in breathing apparatuses				X		X	21	2			8
9.14	Consumer use of garden lime/fertilizer				X		X	21	20, 12			8e
9.15	Consumer use of lime substances as water treatment chemicals in aquaria				X		X	21	20, 37			8
9.16	Consumer use of cosmetics containing lime substances				X		X	21	39			8

ES number 9.1: Manufacture and industrial uses of aqueous solutions of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Manufacture and industrial uses of aqueous solutions of lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures

PROC/ERC	REACH definition	Involved tasks
PROC 1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 12	Use of blowing agents in manufacture of foam	
PROC 13	Treatment of articles by dipping and pouring	
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses	
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential. The spraying of aqueous solutions (PROC7 and 11) is assumed to be involved with a medium emission.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 7	not restricted		aqueous solution	medium
All other applicable PROCs	not restricted		aqueous solution	very low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. Professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 7	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Since aqueous solutions are not used in hot-metallurgical processes, operational conditions (e.g. process temperature and process pressure) are not considered relevant for occupational exposure assessment of the conducted processes.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 7	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	local exhaust ventilation	78 %	-
PROC 19		not applicable	na	-
All other applicable PROCs		not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	**Specification of respiratory protective equipment (RPE)**	**RPE efficiency (assigned protection factor, APF)**	**Specification of gloves**	**Further personal protective equipment (PPE)**
PROC 7	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
All other applicable PROCs	not required	na		
Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE. For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely. The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers. An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.				

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19	MEASE	< 1 mg/m³ (0.001 – 0.66)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental exposure

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of lime substance in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that lime substance will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of lime substance. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

Environmental emissions	The production of lime substance can potentially result in an aquatic emission and locally increase the lime substance concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from lime substance production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.
Exposure concentration in waste water treatment plant (WWTP)	Waste water from lime substance production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from lime substance production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When lime substance is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for lime substance: when lime substance is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for lime substance: when emitted to air as an aerosol in water, lime substance is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised lime substance largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for lime substance: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the lime substance on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

$$pHriver = Log\left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}\right] \quad (Eq\ 1)$$

Where:

Q effluent refers to the effluent flow (in m³/day)

Q river upstream refers to the upstream river flow (in m³/day)

pH effluent refers to the pH of the effluent

pH upstream river refers to the pH of the river upstream of the discharge point

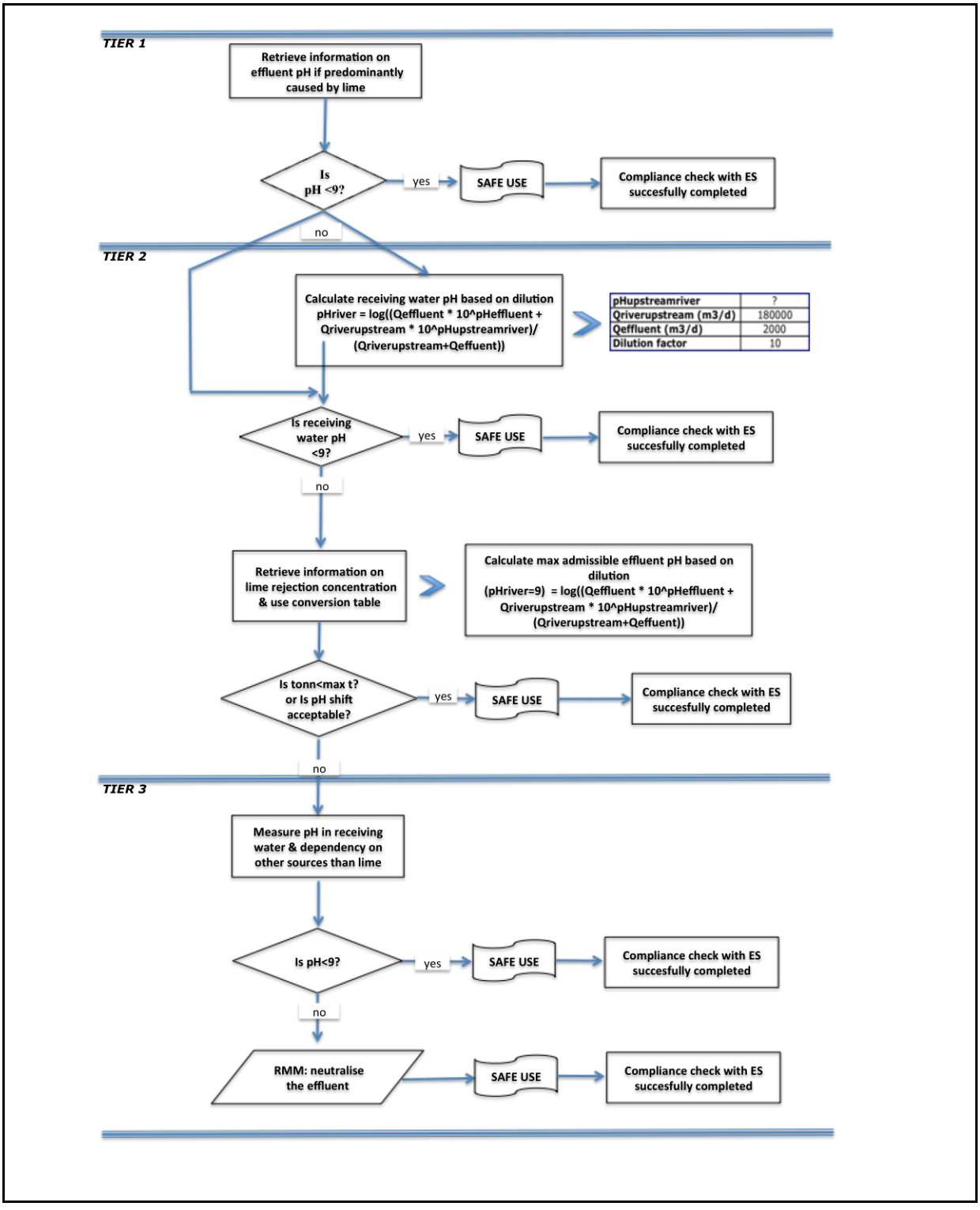
Please note that initially, default values can be used:

- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the lime substance.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.


TIER 1
Retrieve information on effluent pH if predominantly caused by lime
Is pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 2
Calculate receiving water pH based on dilution
pHriver = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
pHupstreamriver ?
Qriverupstream (m3/d) 180000
Qeffluent (m3/d) 2000
Dilution factor 10
Is receiving water pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
Retrieve information on lime rejection concentration & use conversion table
Calculate max admissible effluent pH based on dilution
(pHriver=9) = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
Is tonn<max t? or Is pH shift acceptable?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 3
Measure pH in receiving water & dependency on other sources than lime
Is pH<9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
RMM: neutralise the effluent
SAFE USE
Compliance check with ES succesfully completed

ES number 9.2: Manufacture and industrial uses of low dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Manufacture and industrial uses of low dusty solids/powders of lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures

PROC/ERC	REACH definition	Involved tasks
PROC 1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 6	Calendering operations	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 13	Treatment of articles by dipping and pouring	
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 21	Low energy manipulation of substances bound in materials and/or articles	
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting	
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature	
PROC 24	High (mechanical) energy work-up of substances	

	bound in materials and/or articles
PROC 25	Other hot work operations with metals
PROC 26	Handling of solid inorganic substances at ambient temperature
PROC 27a	Production of metal powders (hot processes)
PROC 27b	Production of metal powders (wet processes)
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high
PROC 24	not restricted		solid/powder	high
All other applicable PROCs	not restricted		solid/powder	low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. Professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 22	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 7, 17, 18	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms	general ventilation	17 %	-
PROC 19		not applicable	na	-
PROC 22, 23, 24, 25, 26, 27a		local exhaust ventilation	78 %	-
All other applicable PROCs		not required	na	-

	or by removing the worker from workplaces involved with relevant exposure.			

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 22, 24, 27a	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
All other applicable PROCs	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27a, 27b	MEASE	<1 mg/m³ (0.01 – 0.83)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that calcium oxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

Environmental emissions	The production of calcium oxide can potentially result in an aquatic emission and locally increase the calcium oxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When calcium oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium oxide: when calcium oxide is emitted to the aquatic compartment, sorption to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium oxide: when emitted to air as an aerosol in water, calcium oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium oxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium oxide: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum

Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the calcium oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

$$pHriver = Log\left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}\right] \quad (Eq\ 1)$$

Where:

Q effluent refers to the effluent flow (in m³/day)

Q river upstream refers to the upstream river flow (in m³/day)

pH effluent refers to the pH of the effluent

pH upstream river refers to the pH of the river upstream of the discharge point

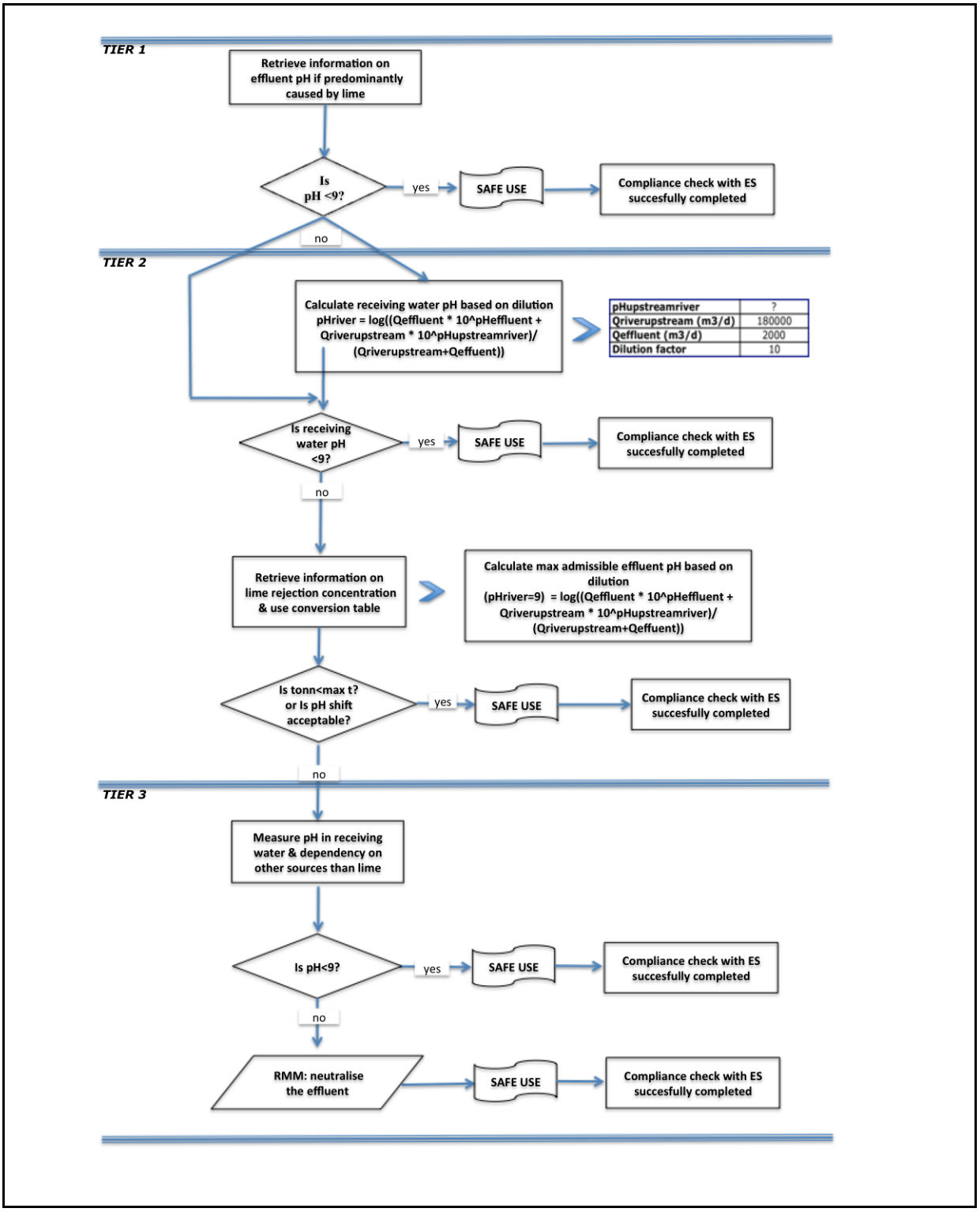
Please note that initially, default values can be used:

- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.


TIER 1
Retrieve information on effluent pH if predominantly caused by lime
Is pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 2
Calculate receiving water pH based on dilution
pHriver = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
pHupstreamriver ?
Qriverupstream (m3/d) 180000
Qeffluent (m3/d) 2000
Dilution factor 10
Is receiving water pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
Retrieve information on lime rejection concentration & use conversion table
Calculate max admissible effluent pH based on dilution
(pHriver=9) = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
Is tonn<max t? or Is pH shift acceptable?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 3
Measure pH in receiving water & dependency on other sources than lime
Is pH<9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
RMM: neutralise the effluent
SAFE USE
Compliance check with ES succesfully completed

ES number 9.3: Manufacture and industrial uses of medium dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Manufacture and industrial uses of medium dusty solids/powders of lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures

PROC/ERC	REACH definition	Involved tasks
PROC 1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 13	Treatment of articles by dipping and pouring	
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting	
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature	
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient	

	temperature
PROC 27a	Production of metal powders (hot processes)
PROC 27b	Production of metal powders (wet processes)
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high
PROC 24	not restricted		solid/powder	high
All other applicable PROCs	not restricted		solid/powder	medium

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. Professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 7, 17, 18, 19, 22	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 1, 2, 15, 27b	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-
PROC 3, 13, 14		general ventilation	17 %	-
PROC 19		not applicable	na	-
All other applicable PROCs		local exhaust ventilation	78 %	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 4, 5, 7, 8a, 8b, 9, 10, 16, 17, 18, 19, 22, 24, 27a	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
All other applicable PROCs	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	MEASE	< 1 mg/m³ (0.01 – 0.88)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that calcium oxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

Environmental emissions	The production of calcium oxide can potentially result in an aquatic emission and locally increase the calcium oxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When calcium oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32–).
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium oxide: when calcium oxide is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium oxide: when emitted to air as an aerosol in water, calcium oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium oxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium oxide: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum

Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the calcium oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

$$pHriver = Log\left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}\right]$$

Eq 1)

Where:

Q effluent refers to the effluent flow (in m³/day)

Q river upstream refers to the upstream river flow (in m³/day)

pH effluent refers to the pH of the effluent

pH upstream river refers to the pH of the river upstream of the discharge point

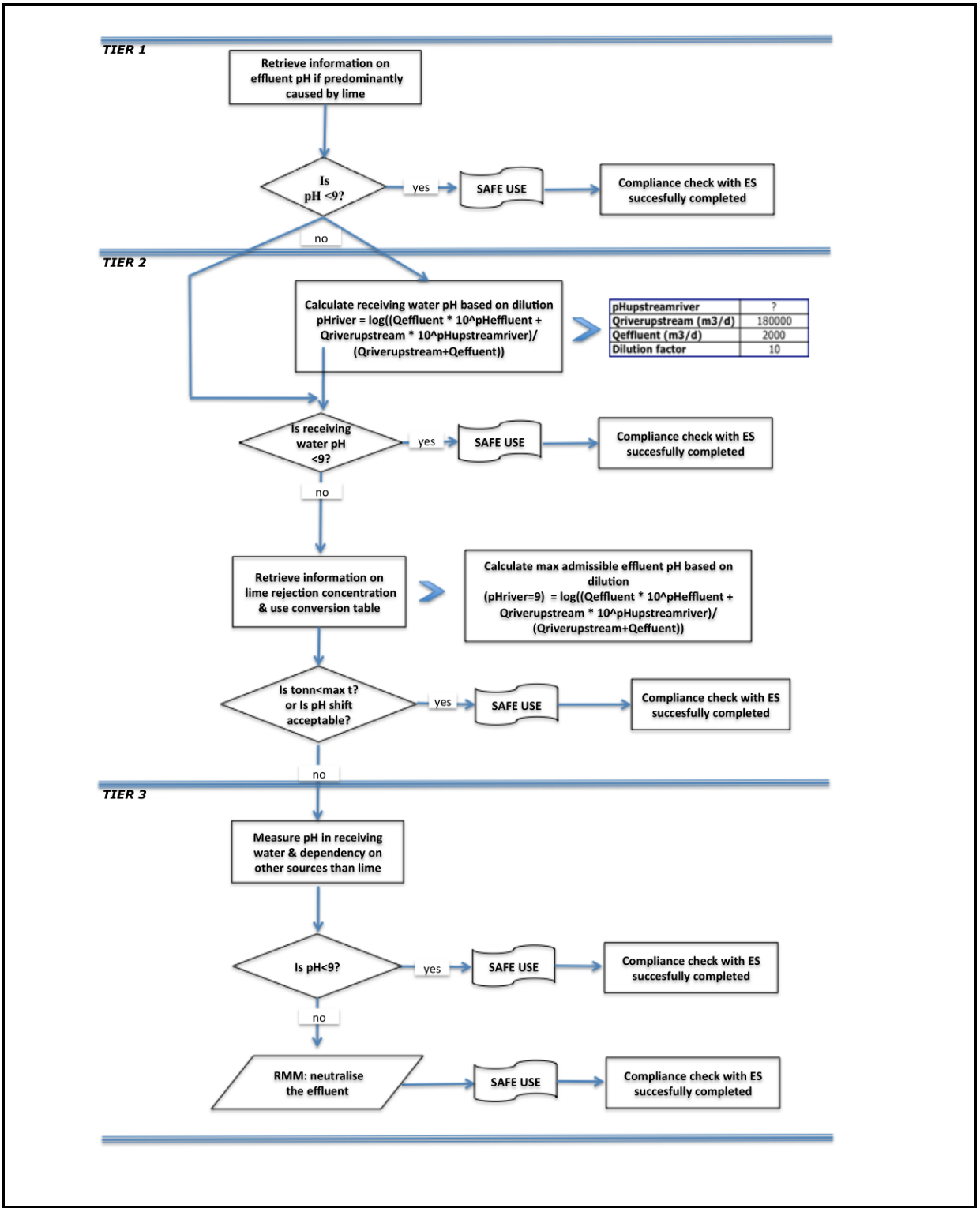
Please note that initially, default values can be used:

- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.


TIER 1
Retrieve information on effluent pH if predominantly caused by lime
Is pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 2
Calculate receiving water pH based on dilution
pHriver = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
pHupstreamriver ?
Qriverupstream (m3/d) 180000
Qeffluent (m3/d) 2000
Dilution factor 10
Is receiving water pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
Retrieve information on lime rejection concentration & use conversion table
Calculate max admissible effluent pH based on dilution
(pHriver=9) = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
Is tonn<max t? or Is pH shift acceptable?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 3
Measure pH in receiving water & dependency on other sources than lime
Is pH<9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
RMM: neutralise the effluent
SAFE USE
Compliance check with ES succesfully completed

ES number 9.4: Manufacture and industrial uses of high dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers	
1. Title	
Free short title	Manufacture and industrial uses of high dusty solids/powders of lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures		
PROC/ERC	**REACH definition**	**Involved tasks**
PROC 1	Use in closed process, no likelihood of exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 2	Use in closed, continuous process with occasional controlled exposure	
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 7	Industrial spraying	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 13	Treatment of articles by dipping and pouring	
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting	
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature	
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient temperature	

PROC 27a	Production of metal powders (hot processes)	
PROC 27b	Production of metal powders (wet processes)	
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses	
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 22, 23, 25, 27a	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	high

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. Professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 7, 8a, 17, 18, 19, 22	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 1	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-
PROC 2, 3		general ventilation	17 %	-
PROC 7		integrated local exhaust ventilation	84 %	-
PROC 19		not applicable	na	-
All other applicable PROCs		local exhaust ventilation	78 %	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 1, 2, 3, 23, 25, 27b	not required	na	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 4, 5, 7, 8a, 8b, 9, 17, 18,	FFP2 mask	APF=10		
PROC 10, 13, 14, 15, 16, 22, 24, 26, 27a	FFP1 mask	APF=4		
PROC 19	FFP3 mask	APF=20		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27a, 27b	MEASE	<1 mg/m³ (0.01 – 0.96)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that calcium oxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

Environmental emissions	The production of calcium oxide can potentially result in an aquatic emission and locally increase the calcium oxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.
Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When calcium oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium oxide: when calcium oxide is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium oxide: when emitted to air as an aerosol in water, calcium oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium oxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium oxide: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty”

and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the calcium oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

$$pHriver = Log\left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}\right] \quad (Eq\ 1)$$

Where:

Q effluent refers to the effluent flow (in m³/day)

Q river upstream refers to the upstream river flow (in m³/day)

pH effluent refers to the pH of the effluent

pH upstream river refers to the pH of the river upstream of the discharge point

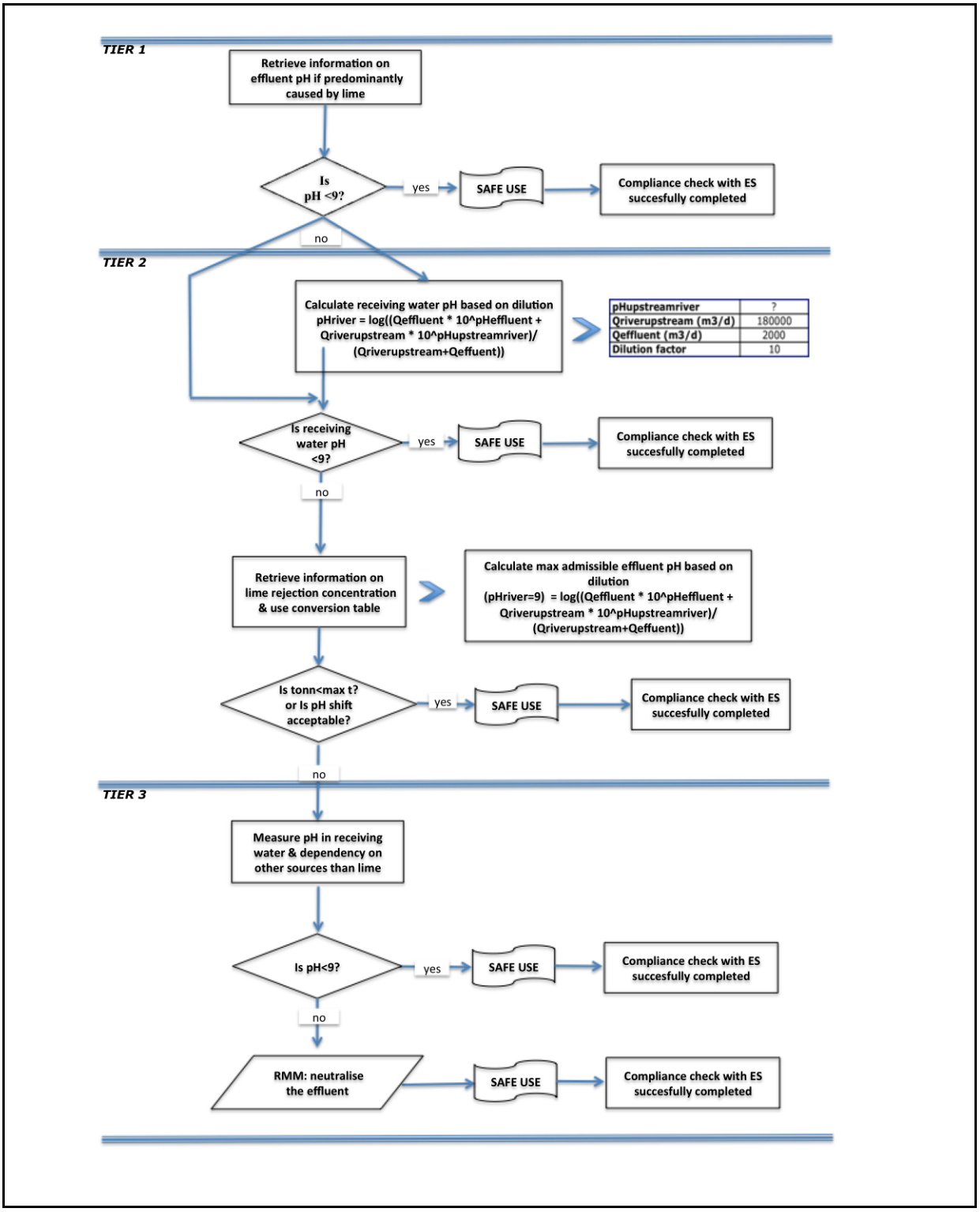
Please note that initially, default values can be used:

- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m³/day
- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.


TIER 1
Retrieve information on effluent pH if predominantly caused by lime
Is pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 2
Calculate receiving water pH based on dilution
pHriver = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
pHupstreamriver ?
Qriverupstream (m3/d) 180000
Qeffluent (m3/d) 2000
Dilution factor 10
Is receiving water pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
Retrieve information on lime rejection concentration & use conversion table
Calculate max admissible effluent pH based on dilution
(pHriver=9) = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
Is tonn<max t? or Is pH shift acceptable?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 3
Measure pH in receiving water & dependency on other sources than lime
Is pH<9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
RMM: neutralise the effluent
SAFE USE
Compliance check with ES succesfully completed

ES number 9.5: Manufacture and industrial uses of massive objects containing lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Manufacture and industrial uses of massive objects containing lime substances
Systematic title based on use descriptor	SU3, SU1, SU2a, SU2b, SU4, SU5, SU6a, SU6b, SU7, SU8, SU9, SU10, SU11, SU12, SU13, SU14, SU15, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC38, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures

PROC/ERC	REACH definition	Involved tasks
PROC 6	Calendering operations	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 14	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	
PROC 21	Low energy manipulation of substances bound in materials and/or articles	
PROC 22	Potentially closed processing operations with minerals/metals at elevated temperature Industrial setting	
PROC 23	Open processing and transfer operations with minerals/metals at elevated temperature	
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles	
PROC 25	Other hot work operations with metals	
ERC 1-7, 12	Manufacture, formulation and all types of industrial uses	
ERC 10, 11	Wide-dispersive outdoor and indoor use of long-life articles and materials	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 22, 23,25	not restricted		massive objects, molten	high
PROC 24	not restricted		massive objects	high
All other applicable PROCs	not restricted		massive objects	very low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. Professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure	
PROC	**Duration of exposure**
PROC 22	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 6, 14, 21	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-
PROC 22, 23, 24, 25		local exhaust ventilation	78 %	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 22	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
All other applicable PROCs	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect

the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Amounts used

The daily and annual amount per site (for point sources) is not considered to be the main determinant for environmental exposure.

Frequency and duration of use

Intermittent (< 12 time per year) or continuous use/release

Environment factors not influenced by risk management

Flow rate of receiving surface water: 18000 m³/day

Other given operational conditions affecting environmental exposure

Effluent discharge rate: 2000 m³/day

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging lime solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised (e.g. through neutralisation). In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms. The justification for this risk management measure can be found in the introduction section.

Conditions and measures related to waste

Solid industrial waste of lime should be reused or discharged to the industrial wastewater and further neutralized if needed.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 6, 14, 21, 22, 23, 24, 25	MEASE	< 1 mg/m³ (0.01 – 0.44)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental emissions

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTPs, as emissions of calcium oxide in the different life-cycle stages (production and use) mainly apply to (waste) water. The aquatic effect and risk assessment only deal with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, being the toxicity of Ca2+ is expected to be negligible compared to the (potential) pH effect. Only the local scale is being addressed, including municipal sewage treatment plants (STPs) or industrial waste water treatment plants (WWTPs) when applicable, both for production and industrial use as any effects that might occur would be expected to take place on a local scale. The high water solubility and very low vapour pressure indicate that calcium oxide will be found predominantly in water. Significant emissions or exposure to air are not expected due to the low vapour pressure of calcium oxide. Significant emissions or exposure to the terrestrial environment are not expected either for this exposure scenario. The exposure assessment for the aquatic environment will therefore only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale. The exposure assessment is approached by assessing the resulting pH impact: the surface water pH should not increase above 9.

Environmental emissions	The production of calcium oxide can potentially result in an aquatic emission and locally increase the calcium oxide concentration and affect the pH in the aquatic environment. When the pH is not neutralised, the discharge of effluent from calcium oxide production sites may impact the pH in the receiving water. The pH of effluents is normally measured very frequently and can be neutralised easily as often required by national laws.

Exposure concentration in waste water treatment plant (WWTP)	Waste water from calcium oxide production is an inorganic wastewater stream and therefore there is no biological treatment. Therefore, wastewater streams from calcium oxide production sites will normally not be treated in biological waste water treatment plants (WWTPs), but can be used for pH control of acid wastewater streams that are treated in biological WWTPs.
Exposure concentration in aquatic pelagic compartment	When calcium oxide is emitted to surface water, sorption to particulate matter and sediment will be negligible. When lime is rejected to surface water, the pH may increase, depending on the buffer capacity of the water. The higher the buffer capacity of the water, the lower the effect on pH will be. In general the buffer capacity preventing shifts in acidity or alkalinity in natural waters is regulated by the equilibrium between carbon dioxide (CO2), the bicarbonate ion (HCO3-) and the carbonate ion (CO32-).
Exposure concentration in sediments	The sediment compartment is not included in this ES, because it is not considered relevant for calcium oxide: when calcium oxide is emitted to the aquatic compartment, sorption of to sediment particles is negligible.
Exposure concentrations in soil and groundwater	The terrestrial compartment is not included in this exposure scenario, because it is not considered to be relevant.
Exposure concentration in atmospheric compartment	The air compartment is not included in this CSA because it is considered not relevant for calcium oxide: when emitted to air as an aerosol in water, calcium oxide is neutralised as a result of its reaction with CO2 (or other acids), into HCO3- and Ca2+. Subsequently, the salts (e.g. calcium(bi)carbonate) are washed out from the air and thus the atmospheric emissions of neutralised calcium oxide largely end up in soil and water.
Exposure concentration relevant for the food chain (secondary poisoning)	Bioaccumulation in organisms is not relevant for calcium oxide: a risk assessment for secondary poisoning is therefore not required.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Occupational exposure

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

Environmental exposure

If a site does not comply with the conditions stipulated in the safe use ES, it is recommended to apply a tiered approach to perform a more site-specific assessment. For that assessment, the following stepwise approach is recommended.

Tier 1: retrieve information on effluent pH and the contribution of the calcium oxide on the resulting pH. Should the pH be above 9 and be predominantly attributable to lime, then further actions are required to demonstrate safe use.

Tier 2a: retrieve information on receiving water pH after the discharge point. The pH of the receiving water shall not exceed the value of 9. If the measures are not available, the pH in the river can be calculated as follows:

$$pHriver = Log\left[\frac{Qeffluent * 10^{pHeffluent} + Qriverupstream * 10^{pHupstream}}{Qriverupstream + Qeffluent}\right] \quad (Eq\ 1)$$

Where:

Q effluent refers to the effluent flow (in m³/day)

Q river upstream refers to the upstream river flow (in m³/day)

pH effluent refers to the pH of the effluent

pH upstream river refers to the pH of the river upstream of the discharge point

Please note that initially, default values can be used:

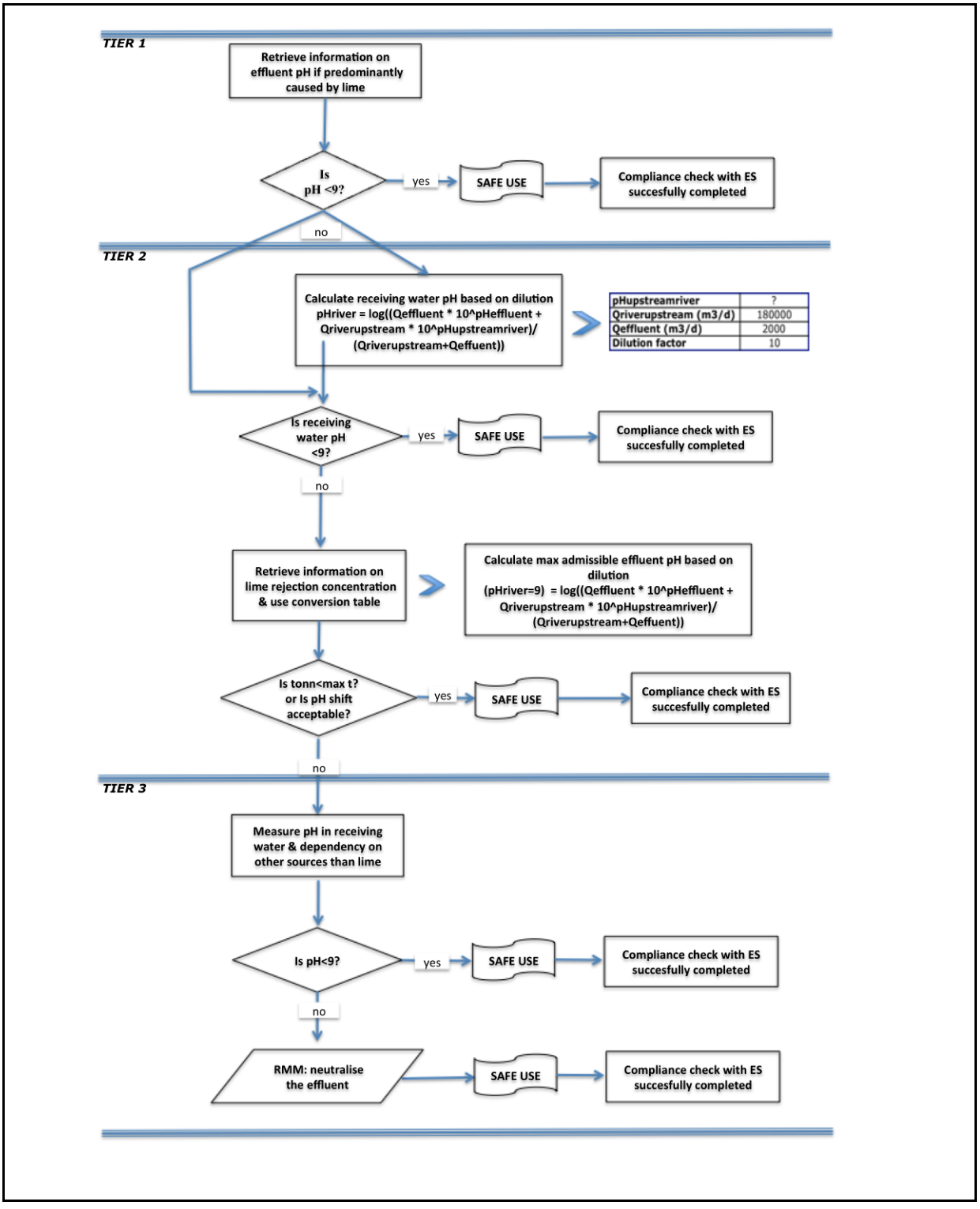
- Q river upstream flows: use the 10th of existing measurements distribution or use default value of 18000 m³/day
- Q effluent: use default value of 2000 m³/day

- The upstream pH is preferably a measured value. If not available, one can assume a neutral pH of 7 if this can be justified.

Such equation has to be seen as a worst case scenario, where water conditions are standard and not case specific.

Tier 2b: Equation 1 can be used to identify which effluent pH causes an acceptable pH level in the receiving body. In order to do so, pH of the river is set at value 9 and pH of the effluent is calculated accordingly (using default values as reported previously, if necessary). As temperature influences lime solubility, pH effluent might require to be adjusted on a case-by-case basis. Once the maximum admissible pH value in the effluent is established, it is assumed that the OH- concentrations are all dependent on lime discharge and that there is no buffer capacity conditions to consider (this is a unrealistic worst case scenario, which can be modified where information is available). Maximum load of lime that can be annually rejected without negatively affecting the pH of the receiving water is calculated assuming chemical equilibrium. OH- expressed as moles/litre are multiplied by average flow of the effluent and then divided by the molar mass of the calcium oxide.

Tier 3: measure the pH in the receiving water after the discharge point. If pH is below 9, safe use is reasonably demonstrated and the ES ends here. If pH is found to be above 9, risk management measures have to be implemented: the effluent has to undergo neutralisation, thus ensuring safe use of lime during production or use phase.


TIER 1
Retrieve information on effluent pH if predominantly caused by lime
Is pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 2
Calculate receiving water pH based on dilution
pHriver = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
pHupstreamriver ?
Qriverupstream (m3/d) 180000
Qeffluent (m3/d) 2000
Dilution factor 10
Is receiving water pH <9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
Retrieve information on lime rejection concentration & use conversion table
Calculate max admissible effluent pH based on dilution
(pHriver=9) = log((Qeffluent * 10^pHeffluent + Qriverupstream * 10^pHupstreamriver)/ (Qriverupstream+Qeffuent))
Is tonn<max t? or Is pH shift acceptable?
yes
SAFE USE
Compliance check with ES succesfully completed
no
TIER 3
Measure pH in receiving water & dependency on other sources than lime
Is pH<9?
yes
SAFE USE
Compliance check with ES succesfully completed
no
RMM: neutralise the effluent
SAFE USE
Compliance check with ES succesfully completed

ES number 9.6: Professional uses of aqueous solutions of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers		
1. Title		
Free short title	Professional uses of aqueous solutions of lime substances	
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)	
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.	
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.	
2. Operational conditions and risk management measures		
PROC/ERC	**REACH definition**	**Involved tasks**
PROC 2	Use in closed, continuous process with occasional controlled exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 11	Non industrial spraying	
PROC 12	Use of blowing agents in manufacture of foam	
PROC 13	Treatment of articles by dipping and pouring	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	Calcium oxide is applied in numerous cases of wide dispersive uses: agricultural, forestry, fish and shrimps farming, soil treatment and environmental protection.

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential. The spraying of aqueous solutions (PROC 11) is assumed to be involved with a medium emission.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
All applicable PROCs	not restricted		aqueous solution	very low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 11	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Since aqueous solutions are not used in hot-metallurgical processes, operational conditions (e.g. process temperature and process pressure) are not considered relevant for occupational exposure assessment of the conducted processes.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 19	Separation of workers from the emission source is generally not required in the conducted processes.	not applicable	na	-
All other applicable PROCs		not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

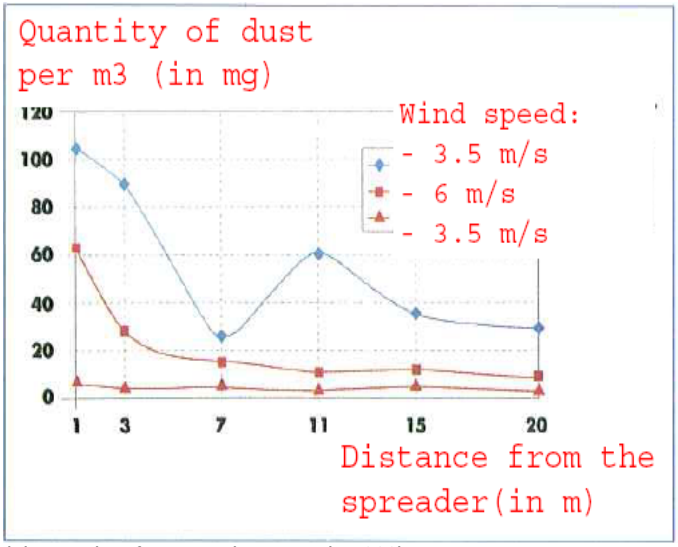
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	**Specification of respiratory protective equipment (RPE)**	**RPE efficiency (assigned protection factor, APF)**	**Specification of gloves**	**Further personal protective equipment (PPE)**
PROC 11	FFP3 mask	APF=20	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 17	FFP1 mask	APF=4		
All other applicable PROCs	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaO	1,700 kg/ha

Frequency and duration of use

1 day/year (one application per year); Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha CaO is not exceeded

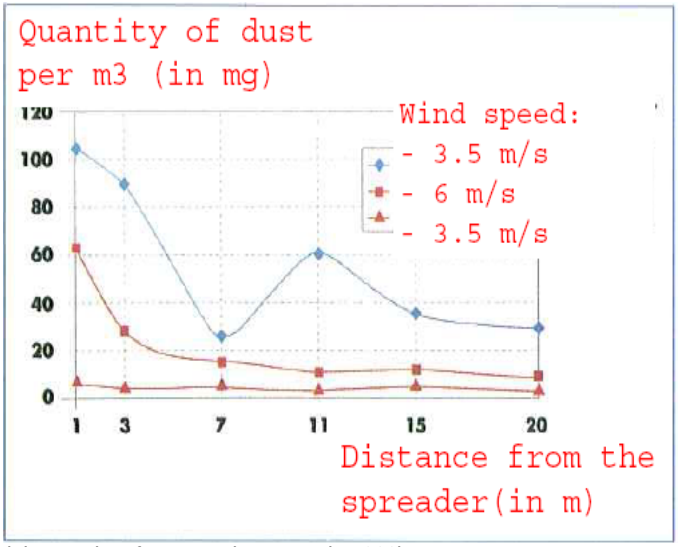
Environment factors not influenced by risk management

Volume of surface water: 300 L/m²
Field surface area: 1 ha

Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
There are no direct releases to adjacent surface waters.
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.
Organizational measures to prevent/limit release from site
In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics
Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used	
CaO	180,000 kg/ha

Frequency and duration of use
1 day/year and only once in a lifetime; Multiple applications during the year are allowed, provided the total yearly amount of 180,000 kg/ha (CaO) is not exceeded
Environment factors not influenced by risk management
Field surface area: 1 ha
Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19	MEASE	< 1 mg/m³ (<0.001 – 0.6)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium oxide can indeed migrate then towards surface waters, via drift.

Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection			
Exposure concentration in aquatic pelagic compartment	**Substance**	**PEC (ug/L)**	**PNEC (mg/L)**	**RCR**
	CaO	5.66	0.37	0.015
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3– to form water and CO32-. CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	500	817.4	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium oxides can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for urban soil treatment

The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a “road technosphere”. The road technosphere can be defined as “the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management”. The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental emissions	See amounts used
Exposure	Not relevant for road border scenario

concentration in waste water treatment plant (WWTP)				
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	529	817.4	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for other uses

For all other uses, no quantitative environmental exposure assessment is carried because

- The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment
- Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water
- Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited
- Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.7: Professional uses of low dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers		
1. Title		
Free short title	Professional uses of low dusty solids/powders of lime substances	
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)	
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.	
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.	
2. Operational conditions and risk management measures		
PROC/ERC	**REACH definition**	**Involved tasks**
PROC 2	Use in closed, continuous process with occasional controlled exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 11	Non industrial spraying	
PROC 13	Treatment of articles by dipping and pouring	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 21	Low energy manipulation of substances bound in materials and/or articles	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient temperature	
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 25	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	low

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 17	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 19	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not applicable	na	-
All other applicable PROCs		not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

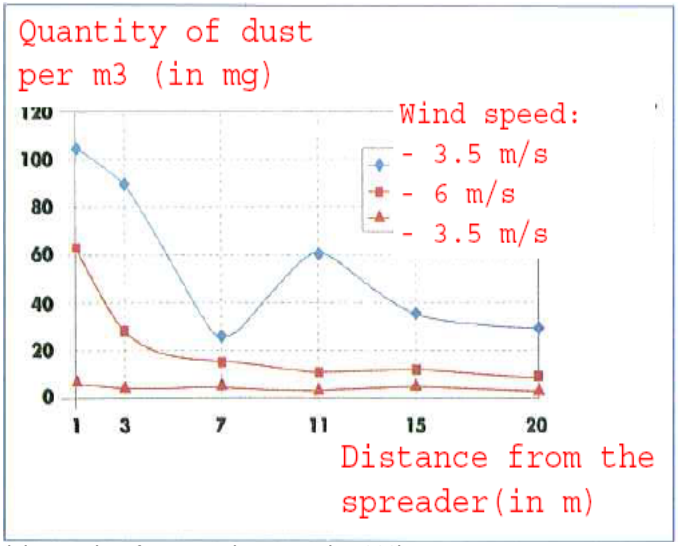
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	**Specification of respiratory protective equipment (RPE)**	**RPE efficiency (assigned protection factor, APF)**	**Specification of gloves**	**Further personal protective equipment (PPE)**
PROC 4, 5, 11, 26	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 16, 17, 18, 25	FFP2 mask	APF=10		
All other applicable PROCs	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaO	1,700 kg/ha

Frequency and duration of use

1 day/year (one application per year)Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha is not exceeded (CaO)

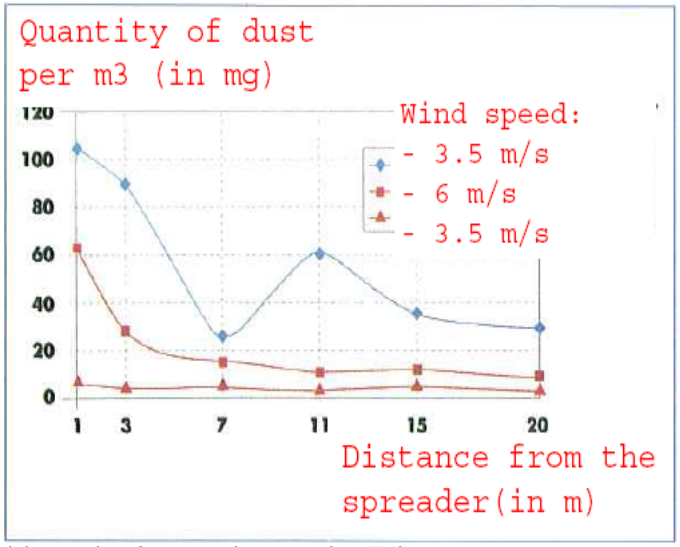
Environment factors not influenced by risk management

Volume of surface water: 300 L/m²
Field surface area: 1 ha

Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
There are no direct releases to adjacent surface waters.
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.
Organizational measures to prevent/limit release from site
In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics
Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used	
CaO	180,000 kg/ha

Frequency and duration of use
1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 180,000 kg/ha is not exceeded (CaO)
Environment factors not influenced by risk management
Field surface area: 1 ha
Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 21, 25, 26	MEASE	< 1 mg/m³ (0.01 – 0.75)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium oxide can indeed migrate then towards surface waters, via drift.

Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection			
Exposure concentration in aquatic pelagic compartment	**Substance**	**PEC (ug/L)**	**PNEC (mg/L)**	**RCR**
	CaO	5.66	0.37	0.015
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32-. CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	500	817.4	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for urban soil treatment

The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a “road technosphere”. The road technosphere can be defined as “the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management”. The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental emissions	See amounts used
Exposure	Not relevant for road border scenario

concentration in waste water treatment plant (WWTP)				
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	529	817.4	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for other uses

For all other uses, no quantitative environmental exposure assessment is carried because

- The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment
- Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water
- Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited
- Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.8: Professional uses of medium dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers	
1. Title	
Free short title	Professional uses of medium dusty solids/powders of lime substances
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.

2. Operational conditions and risk management measures		
PROC/ERC	**REACH definition**	**Involved tasks**
PROC 2	Use in closed, continuous process with occasional controlled exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 11	Non industrial spraying	
PROC 13	Treatment of articles by dipping and pouring	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient temperature	
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
PROC 25	not restricted		solid/powder, molten	high
All other applicable PROCs	not restricted		solid/powder	medium

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 11, 16, 17, 18, 19	≤ 240 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 11, 16	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	generic local exhaust ventilation	72 %	-
PROC 17, 18		integrated local exhaust ventilation	87 %	-
PROC 19		not applicable	na	-
All other applicable PROCs		not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

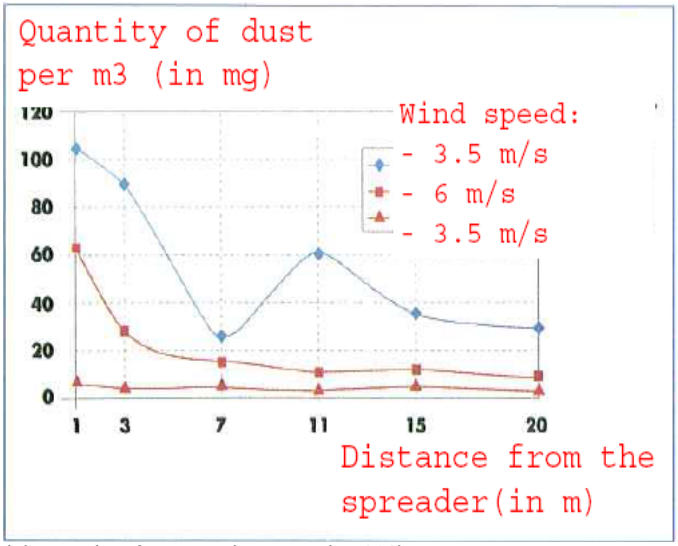
PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 2, 3, 16, 19	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 4, 5, 8a, 8b, 9, 10, 13, 17, 18, 25, 26	FFP2 mask	APF=10		
PROC 11	FFP1 mask	APF=10		
PROC 15	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaO	1,700 kg/ha

Frequency and duration of use

1 day/year (one application per year) Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha is not exceeded (CaO)

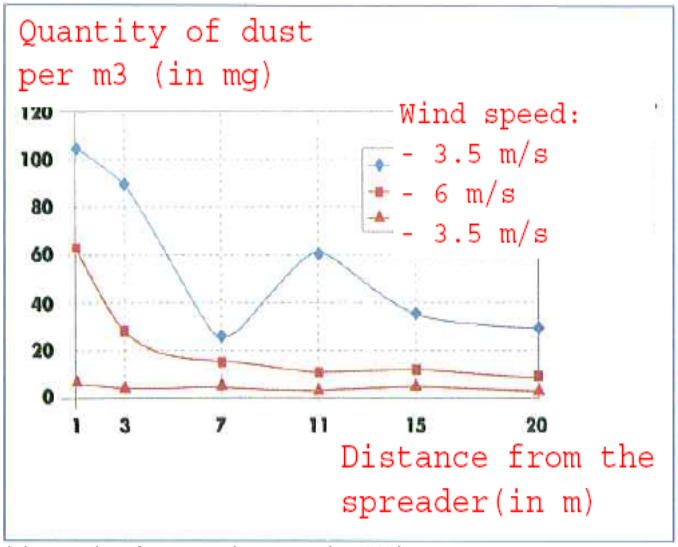
Environment factors not influenced by risk management

Volume of surface water: 300 L/m²
Field surface area: 1 ha

Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
There are no direct releases to adjacent surface waters.
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.
Organizational measures to prevent/limit release from site
In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics
Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used	
CaO	180,000 kg/ha
Frequency and duration of use	
1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 180,000 kg/ha is not exceeded (CaO)	
Environment factors not influenced by risk management	
Field surface area: 1 ha	
Other given operational conditions affecting environmental exposure	
Outdoor use of products Soil mixing depth: 20 cm	
Technical conditions and measures at process level (source) to prevent release	
Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Drift should be minimised.	

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 25, 26	MEASE	< 1 mg/m³ (0.25 – 0.825)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium oxide can indeed migrate then towards surface waters, via drift.

Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection			
Exposure concentration in aquatic pelagic compartment	**Substance**	**PEC (ug/L)**	**PNEC (mg/L)**	**RCR**
	CaO	5.66	0.37	0.015
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32-. CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	500	817.4	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for urban soil treatment

The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a “road technosphere”. The road technosphere can be defined as “the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management”. The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental emissions	See amounts used

Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road border scenario			
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	529	817.4	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for other uses

For all other uses, no quantitative environmental exposure assessment is carried because

- The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment
- Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water
- Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited
- Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.9: Professional uses of high dusty solids/powders of lime substances

Exposure Scenario Format (1) addressing uses carried out by workers	
1. Title	
Free short title	Professional uses of high dusty solids/powders of lime substances
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 PC1, PC2, PC3, PC7, PC8, PC9a, PC9b, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC23, PC24, PC25, PC26, PC27, PC28, PC29, PC30, PC31, PC32, PC33, PC34, PC35, PC36, PC37, PC39, PC40 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.

2. Operational conditions and risk management measures		
PROC/ERC	**REACH definition**	**Involved tasks**
PROC 2	Use in closed, continuous process with occasional controlled exposure	Further information is provided in the ECHA Guidance on information requirements and chemical safety assessment, Chapter R.12: Use descriptor system (ECHA-2010-G-05-EN).
PROC 3	Use in closed batch process (synthesis or formulation)	
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
PROC 8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	
PROC 8b	Transfer of substance or preparation (charging/ discharging) from/to vessels/large containers at dedicated facilities	
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
PROC 10	Roller application or brushing	
PROC 11	Non industrial spraying	
PROC 13	Treatment of articles by dipping and pouring	
PROC 15	Use as laboratory reagent	
PROC 16	Using material as fuel sources, limited exposure to unburned product to be expected	
PROC 17	Lubrication at high energy conditions and in partly open process	
PROC 18	Greasing at high energy conditions	
PROC 19	Hand-mixing with intimate contact and only PPE available	
PROC 25	Other hot work operations with metals	
PROC 26	Handling of solid inorganic substances at ambient temperature	
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Use in preparation	Content in preparation	Physical form	Emission potential
All applicable PROCs	not restricted		solid/powder	high

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

PROC	Duration of exposure
PROC 4, 5, 8a, 8b, 9, 10, 16, 17, 18, 19, 26	≤ 240 minutes
PROC 11	≤ 60 minutes
All other applicable PROCs	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 4, 5, 8a, 8b, 9, 11, 16, 26	Any potentially required separation of workers from the emission source is indicated above under "Frequency and duration of exposure". A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	generic local exhaust ventilation	72 %	-
PROC 17, 18		integrated local exhaust ventilation	87 %	-
PROC 19		not applicable	na	only in well ventilated rooms or outdoors (efficiency 50 %)-
All other applicable PROCs		not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

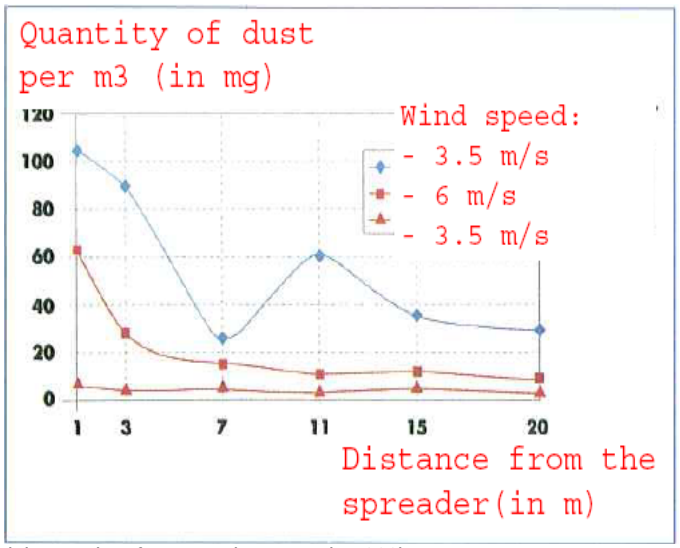
Conditions and measures related to personal protection, hygiene and health evaluation				
PROC	**Specification of respiratory protective equipment (RPE)**	**RPE efficiency (assigned protection factor, APF)**	**Specification of gloves**	**Further personal protective equipment (PPE)**
PROC 9, 26	FFP1 mask	APF=4	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 11, 17, 18, 19	FFP3 mask	APF=20		
PROC 25	FFP2 mask	APF=10		
All other applicable PROCs	FFP2 mask	APF=10		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with "duration of exposure" above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker's capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used	
CaO	1,700 kg/ha

Frequency and duration of use

1 day/year (one application per year). Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha is not exceeded (CaO)

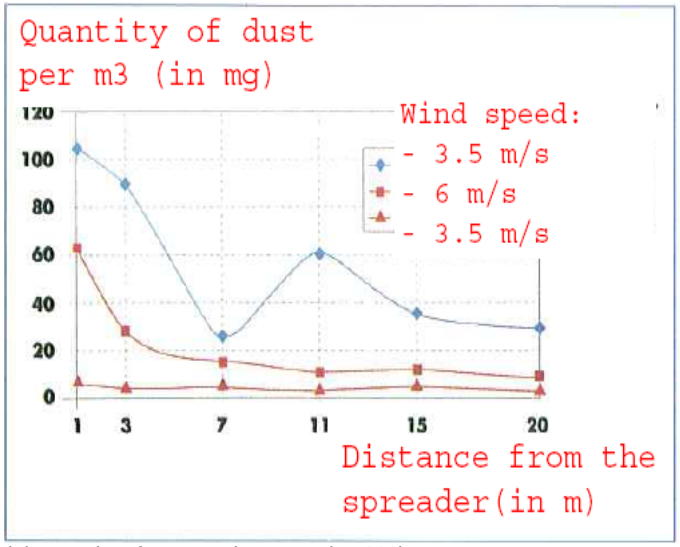
Environment factors not influenced by risk management

Volume of surface water: 300 L/m2
Field surface area: 1 ha

Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
There are no direct releases to adjacent surface waters.
Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.
Organizational measures to prevent/limit release from site
In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics
Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used	
CaO	180,000 kg/ha

Frequency and duration of use
1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 180,000 kg/ha is not exceeded (CaO)
Environment factors not influenced by risk management
Field surface area: 1 ha
Other given operational conditions affecting environmental exposure
Outdoor use of products Soil mixing depth: 20 cm
Technical conditions and measures at process level (source) to prevent release
Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 16, 17, 18, 19, 25, 26	MEASE	<1 mg/m³ (0.5 – 0.825)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium oxide can indeed migrate then towards surface waters, via drift.

Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection			
Exposure concentration in aquatic pelagic compartment	**Substance**	**PEC (ug/L)**	**PNEC (mg/L)**	**RCR**
	CaO	5.66	0.37	0.015
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32-. CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	500	817.4	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for urban soil treatment

The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a “road technosphere”. The road technosphere can be defined as “the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management”. The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental emissions	See amounts used

Exposure concentration in waste water treatment plant (WWTP)	Not relevant for road border scenario			
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	529	817.4	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for other uses

For all other uses, no quantitative environmental exposure assessment is carried because

- The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment
- Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water
- Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited
- Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.10: Professional use of lime substances in soil treatment

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Professional use of lime substances in soil treatment
Systematic title based on use descriptor	SU22 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on measured data and on the exposure estimation tool MEASE. The environmental assessment is based on FOCUS-Exposit.

2. Operational conditions and risk management measures

Task/ERC	REACH definition	Involved tasks
Milling	PROC 5	Preparation and use of calcium oxides for soil treatment.
Loading of spreader	PROC 8b, PROC 26	
Application to soil (spreading)	PROC 11	
ERC2, ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f	Wide dispersive indoor and outdoor use of reactive substances or processing aids in open systems	Calcium oxide is applied in numerous cases of wide dispersive uses: agricultural, forestry, fish and shrimps farming, soil treatment and environmental protection.

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

Task	Use in preparation	Content in preparation	Physical form	Emission potential
Milling	not restricted		solid/powder	high
Loading of spreader	not restricted		solid/powder	high
Application to soil (spreading)	not restricted		solid/powder	high

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure

Task	Duration of exposure
Milling	240 minutes
Loading of spreader	240 minutes
Application to soil (spreading)	480 minutes (not restricted)

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions (e.g. process temperature and process pressure) are not considered relevant for occupational exposure assessment of the conducted processes.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

Task	Level of separation	Localised controls (LC)	Efficiency of LC	Further information
Milling	Separation of workers is generally not required in the conducted processes.	not required	na	-
Loading of spreader		not required	na	-
Application to soil (spreading)	During application the worker is sitting in the cabin of the spreader	Cabin with filtered air supply	99%	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

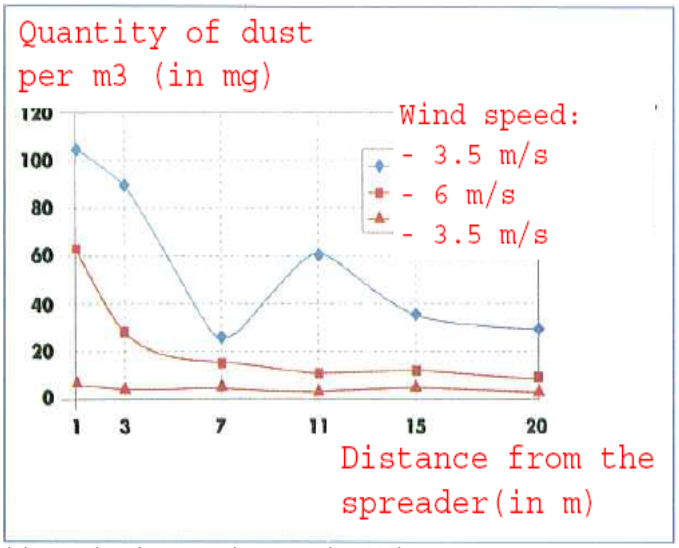
Task	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
Milling	FFP3 mask	APF=20	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
Loading of spreader	FFP3 mask	APF=20		
Application to soil (spreading)	not required	na		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure – only relevant for agricultural soil protection

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaO	1,700 kg/ha

Frequency and duration of use

1 day/year (one application per year). Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha (CaO) is not exceeded

Environment factors not influenced by risk management

Volume of surface water: 300 L/m²
Field surface area: 1 ha

Other given operational conditions affecting environmental exposure

Outdoor use of products
Soil mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

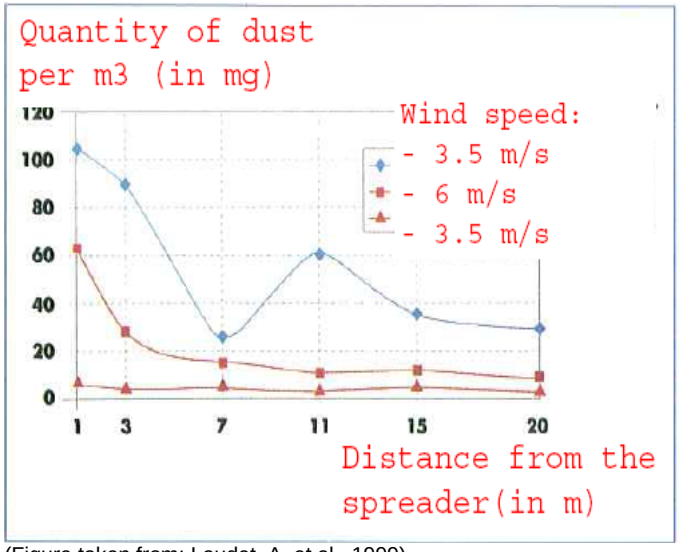
Organizational measures to prevent/limit release from site

In line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of lime and the application rate should be adjusted according to the results of the analysis.

2.2 Control of environmental exposure – only relevant for urban soil treatment

Product characteristics

Drift: 1% (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)



(Figure taken from: Laudet, A. et al., 1999)

Amounts used

CaO	180,000 kg/ha

Frequency and duration of use

1 day/year and only once in a lifetime. Multiple applications during the year are allowed, provided the total yearly amount of 180,000 kg/ha is not exceeded (CaO)

Environment factors not influenced by risk management

Field surface area: 1 ha

Other given operational conditions affecting environmental exposure

Outdoor use of products
Soil mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

Lime is only applied onto the soil in the technosphere zone before road construction. There are no direct releases to adjacent surface waters.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

3. Exposure estimation and reference to its source

Occupational exposure

Measured data and modelled exposure estimates (MEASE) were used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust).

Task	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
Milling	MEASE	0.488 mg/m³ (0.48)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	
Loading of spreader	MEASE (PROC 8b)	0.488 mg/m³ (0.48)		
Application to soil (spreading)	measured data	0.880 mg/m³ (0.88)		

Environmental exposure for agricultural soil protection

The PEC calculation for soil and surface water was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data: once applied on the soil, calcium oxide can indeed migrate then towards surface waters, via drift.

Environmental emissions	See amounts used			
Exposure concentration in waste water treatment plant (WWTP)	Not relevant for agricultural soil protection			
Exposure concentration in aquatic pelagic compartment	**Substance**	**PEC (ug/L)**	**PNEC (mg/L)**	**RCR**
	CaO	5.66	0.37	0.015
Exposure concentration in sediments	As described above, no exposure of surface water nor sediment to lime is expected. Further, in natural waters the hydroxide ions react with HCO3- to form water and CO32-. CO32- forms CaCO3 by reacting with Ca2+. The calcium carbonate precipitates and deposits on the sediment. Calcium carbonate is of low solubility and a constituent of natural soils.			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	500	817.4	0.61
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for urban soil treatment

The urban soil treatment scenario is based on a road border scenario. At the special road border technical meeting (Ispra, September 5, 2003), EU Member States and industry agreed on a definition for a “road technosphere”. The road technosphere can be defined as “the engineered environment that carries the geotechnical functions of the road in connection with its structure, operation and maintenance including the installations to ensure road safety and manage run off. This technosphere, which includes the hard and soft shoulder at the edge of the carriageway, is vertically dictated by the groundwater watertable. The road authority has responsibility for this road technosphere including road safety, road support, prevention of pollution and water management”. The road technosphere was therefore excluded as assessment endpoint for risk assessment for the purpose of the existing/new substances regulations. The target zone is the zone beyond the technosphere, to which the environmental risk assessment applies.

The PEC calculation for soil was based on the FOCUS soil group (FOCUS, 1996) and on the “draft guidance on the calculation of predicted environmental concentration values (PEC) of plant protection products for soil, ground water, surface water and sediment (Kloskowksi et al., 1999). The FOCUS/EXPOSIT modelling tool is preferred to the EUSES as it is more appropriate for agricultural-like application as in this case where parameter as the drift needs to be included in the modelling. FOCUS is a model typically developed for biocidal applications and was further elaborated on the basis of the German EXPOSIT 1.0 model, where parameters such as drifts can be improved according to collected data.

Environmental emissions	See amounts used
Exposure concentration in	Not relevant for road border scenario

waste water treatment plant (WWTP)				
Exposure concentration in aquatic pelagic compartment	Not relevant for road border scenario			
Exposure concentration in sediments	Not relevant for road border scenario			
Exposure concentrations in soil and groundwater	**Substance**	**PEC (mg/L)**	**PNEC (mg/L)**	**RCR**
	CaO	529	817.4	0.65
Exposure concentration in atmospheric compartment	This point is not relevant. Calcium oxide is not volatile. The vapour pressures is below 10^{-5} Pa.			
Exposure concentration relevant for the food chain (secondary poisoning)	This point is not relevant because calcium can be considered to be omnipresent and essential in the environment. The uses covered do not significantly influence the distribution of the constituents (Ca^{2+} and OH^-) in the environment.			

Environmental exposure for other uses

For all other uses, no quantitative environmental exposure assessment is carried because

- The operational conditions and risk management measures are less stringent than those outlined for agricultural soil protection or urban soil treatment
- Lime is an ingredient and chemically bound into a matrix. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water
- Lime is specifically used to release CO2-free breathable air, upon reaction with CO2. Such applications only relates to the air compartment, where the lime properties are exploited
- Neutralisation/pH-shift is the intended use and there are no additional impacts beyond those desired.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.11: Professional uses of articles/containers containing lime substances

Exposure Scenario Format (1) addressing uses carried out by workers

1. Title

Free short title	Professional uses of articles/containers containing lime substances
Systematic title based on use descriptor	SU22, SU1, SU5, SU6a, SU6b, SU7, SU10, SU11, SU12, SU13, SU16, SU17, SU18, SU19, SU20, SU23, SU24 AC1, AC2, AC3, AC4, AC5, AC6, AC7, AC8, AC10, AC11, AC13 (appropriate PROCs and ERCs are given in Section 2 below)
Processes, tasks and/or activities covered	Processes, tasks and/or activities covered are described in Section 2 below.
Assessment Method	The assessment of inhalation exposure is based on the exposure estimation tool MEASE.

2. Operational conditions and risk management measures

PROC/ERC	REACH definition	Involved tasks
PROC 0	Other process (PROC 21 (low emission potential) as proxy for exposure estimation)	Use of containers containing calcium oxide/preparations as CO_2 absorbents (e.g. breathing apparatus)
PROC 21	Low energy manipulation of substances bound in materials and/or articles	Handling of substances bound in materials and/or articles
PROC 24	High (mechanical) energy work-up of substances bound in materials and/or articles	Grinding, mechanical cutting
PROC 25	Other hot work operations with metals	Welding, soldering
ERC10, ERC11, ERC 12	Wide dispersive indoor and outdoor use of long-life articles and materials with low release	Calcium oxide bound into or onto articles and materials such as: wooden and plastic construction and building materials (e.g. gutters, drains), flooring, furniture, toys, leather products, paper and cardboard products (magazines, books, news paper and packaging paper), electronic equipment (casing)

2.1 Control of workers exposure

Product characteristic

According to the MEASE approach, the substance-intrinsic emission potential is one of the main exposure determinants. This is reflected by an assignment of a so-called fugacity class in the MEASE tool. For operations conducted with solid substances at ambient temperature the fugacity is based on the dustiness of that substance. Whereas in hot metal operations, fugacity is temperature based, taking into account the process temperature and the melting point of the substance. As a third group, high abrasive tasks are based on the level of abrasion instead of the substance intrinsic emission potential.

PROC	Used in preparation?	Content in preparation	Physical form	Emission potential
PROC 0	not restricted		massive objects (pellets), low potential for dust formation due to abrasion during previous filling and handling activities of pellets, not during use of breathing apparatus	low (worst case assumption as no inhalation exposure is assumed during the use of the breathing apparatus due to the very low abrasive potential)
PROC 21	not restricted		massive objects	very low
PROC 24, 25	not restricted		massive objects	high

Amounts used

The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROC) is the main determinant of the process intrinsic emission potential.

Frequency and duration of use/exposure	
PROC	**Duration of exposure**
PROC 0	480 minutes (not restricted as far as occupational exposure to calcium oxide is concerned, the actual wearing duration may be restricted due the user instructions of the actual breathing apparatus)
PROC 21	480 minutes (not restricted)
PROC 24, 25	≤ 240 minutes

Human factors not influenced by risk management

The shift breathing volume during all process steps reflected in the PROCs is assumed to be 10 m³/shift (8 hours).

Other given operational conditions affecting workers exposure

Operational conditions like process temperature and process pressure are not considered relevant for occupational exposure assessment of the conducted processes. In process steps with considerably high temperatures (i.e. PROC 22, 23, 25), the exposure assessment in MEASE is however based on the ratio of process temperature and melting point. As the associated temperatures are expected to vary within the industry the highest ratio was taken as a worst case assumption for the exposure estimation. Thus all process temperatures are automatically covered in this exposure scenario for PROC 22, 23 and PROC 25.

Technical conditions and measures at process level (source) to prevent release

Risk management measures at the process level (e.g. containment or segregation of the emission source) are generally not required in the processes.

Technical conditions and measures to control dispersion from source towards the worker

PROC	Level of separation	Localised controls (LC)	Efficiency of LC (according to MEASE)	Further information
PROC 0, 21, 24, 25	Any potentially required separation of workers from the emission source is indicated above under “Frequency and duration of exposure”. A reduction of exposure duration can be achieved, for example, by the installation of ventilated (positive pressure) control rooms or by removing the worker from workplaces involved with relevant exposure.	not required	na	-

Organisational measures to prevent /limit releases, dispersion and exposure

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking at the workplace, the wearing of standard working clothes and shoes unless otherwise stated below. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions and measures related to personal protection, hygiene and health evaluation

PROC	Specification of respiratory protective equipment (RPE)	RPE efficiency (assigned protection factor, APF)	Specification of gloves	Further personal protective equipment (PPE)
PROC 0, 21	not required	na	Since calcium oxide is classified as irritating to skin, the use of protective gloves is mandatory for all process steps.	Eye protection equipment (e.g. goggles or visors) must be worn, unless potential contact with the eye can be excluded by the nature and type of application (i.e. closed process). Additionally, face protection, protective clothing and safety shoes are required to be worn as appropriate.
PROC 24, 25	FFP1 mask	APF=4		

Any RPE as defined above shall only be worn if the following principles are implemented in parallel: The duration of work (compare with “duration of exposure” above) should reflect the additional physiological stress for the worker due to the breathing resistance and mass of the RPE itself, due to the increased thermal stress by enclosing the head. In addition, it shall be considered that the worker’s capability of using tools and of communicating are reduced during the wearing of RPE.
For reasons as given above, the worker should therefore be (i) healthy (especially in view of medical problems that may affect the use of RPE), (ii) have suitable facial characteristics reducing leakages between face and mask (in view of scars and facial hair). The recommended devices above which rely on a tight face seal will not provide the required protection unless they fit the

contours of the face properly and securely.
The employer and self-employed persons have legal responsibilities for the maintenance and issue of respiratory protective devices and the management of their correct use in the workplace. Therefore, they should define and document a suitable policy for a respiratory protective device programme including training of the workers.
An overview of the APFs of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE.

2.2 Control of environmental exposure

Product characteristics

Lime is chemically bound into/onto a matrix with very low release potential

3. Exposure estimation and reference to its source

Occupational exposure

The exposure estimation tool MEASE was used for the assessment of inhalation exposure. The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on the DNEL for calcium oxide of 1 mg/m³ (as respirable dust) and the respective inhalation exposure estimate derived using MEASE (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction being a sub-fraction of the inhalable fraction according to EN 481.

PROC	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
PROC 0	MEASE (PROC 21)	0.5 mg/m³ (0.5)	Since calcium oxide is classified as irritating to skin, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	
PROC 21	MEASE	0.05 mg/m³ (0.05)		
PROC 24	MEASE	0.825 mg/m³ (0.825)		
PROC 25	MEASE	0.6 mg/m³ (0.6)		

Environmental exposure

Lime is an ingredient and is chemically bound into a matrix: there is no intended release of lime during normal and reasonable foreseeable conditions of use. Releases are negligible and insufficient to cause a pH-shift in soil, wastewater or surface water.

4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary. For example, substances with a dustiness less than 2.5 % according to the Rotating Drum Method (RDM) are defined as “low dusty”, substances with a dustiness less than 10 % (RDM) are defined as “medium dusty” and substances with a dustiness ≥10 % are defined as “high dusty”.

$DNEL_{inhalation}$: 1 mg/m³ (as respirable dust)

Important note: The DU has to be aware of the fact that apart from the long-term DNEL given above, a DNEL for acute effects exists at a level of 4 mg/m³. By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2). When using MEASE for the derivation of exposure estimates, it is noted that the exposure duration should only be reduced to half-shift as a risk management measure (leading to an exposure reduction of 40 %).

ES number 9.12: Consumer use of building and construction material (DIY – do it yourself)

Exposure Scenario Format (2) addressing uses carried out by consumers	
1. Title	
Free short title	Consumer use of building and construction material
Systematic title based on use descriptor	SU21, PC9a, PC9b, ERC8c, ERC8d, ERC8e, ERC8f
Processes, tasks activities covered	Handling (mixing and filling) of powder formulations Application of liquid, pasty lime preparations.
Assessment Method*	Human health: A qualitative assessment has been performed for oral and dermal exposure as well as exposure to the eye. Inhalation exposure to dust has been assessed by the Dutch model (van Hemmen, 1992). Environment:A qualitative justification assessment is provided.

2. Operational conditions and risk management measures	
RMM	No product integrated risk management measures are in place.
PC/ERC	**Description of activity referring to article categories (AC) and environmental release categories (ERC)**
PC 9a, 9b	Mixing and loading of powder containing lime substances. Application of lime plaster, putty or slurry to the walls or ceiling. Post-application exposure.
ERC 8c, 8d, 8e, 8f	Wide dispersive indoor use resulting in inclusion into or onto a matrix Wide dispersive outdoor use of processing aids in open systems Wide dispersive outdoor use of reactive substances in open systems Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Control of consumers exposure

Product characteristic

Description of the preparation	**Concentration of the substance in the preparation**	**Physical state of the preparation**	**Dustiness (if relevant)**	**Packaging design**
Lime substance	100 %	Solid, powder	High, medium and low, depending on the kind of lime substance (indicative value from DIY[1] fact sheet see section 9.0.3)	Bulk in bags of up to 35 kg.
Plaster, Mortar	20-40%	Solid, powder		
Plaster, Mortar	20-40%	Pasty	-	-
Putty, filler	30-55%	Pasty, highly viscous, thick liquid	-	In tubes or buckets
Pre-mixed lime wash paint	~30%	Solid, powder	High - low (indicative value from DIY[1] fact sheet see section 9.0.3)	Bulk in bags of up to 35 kg.
Lime wash paint/milk of lime preparation	~ 30 %	Milk of lime preparation	-	-

Amounts used

Description of the preparation	**Amount used per event**
Filler, putty	250 g – 1 kg powder (2:1 powder water) Difficult to determine, because the amount is heavily dependent on the depth and size of the holes to be filled.
Plaster/lime wash paint	~ 25 kg depending on the size of the room, wall to be treated.
Floor/wall equalizer	~ 25 kg depending on the size of the room, wall to be equalized.

Frequency and duration of use/exposure

Description of task	**Duration of exposure per event**	**frequency of events**
Mixing and loading of lime containing powder.	1.33 min (DIY[1]-fact sheet, RIVM, Chapter 2.4.2 Mixing and loading of powders)	2/year (DIY[1] fact sheet)
Application of lime plaster, putty or slurry to the walls or ceiling	Several minutes - hours	2/year (DIY[1] fact sheet)

Human factors not influenced by risk management

Description of the task	**Population exposed**	**Breathing rate**	**Exposed body part**	**Corresponding skin area [cm²]**
Handling of powder	Adult	1.25 m³/hr	Half of both hands	430 (DIY[1] fact sheet)
Application of liquid, pasty lime preparations.	Adult	NR	Hands and forearms	1900 (DIY[1] fact sheet)

Other given operational conditions affecting consumers exposure

Description of the task	Indoor/outdoor	Room volume	Air exchange rate
Handling of powder	indoor	1 m³ (personal space, small area around the user)	0.6 hr^{-1} (unspecified room)
Application of liquid, pasty lime preparations.	indoor	NR	NR

Conditions and measures related to information and behavioural advice to consumers

In order to avoid health damage DIYers should comply with the same strict protective measures which apply to professional workplaces:

- Change wet clothing, shoes and gloves immediately.
- Protect uncovered areas of skin (arms, legs, face): there are various effective skin protection products which should be used in accordance with a skin protection plan (skin protection, cleansing and care). Cleanse the skin thoroughly after the work and apply a care product.

Conditions and measures related to personal protection and hygiene

In order to avoid health damage DIYers should comply with the same strict protective measures which apply to professional workplaces:

- When preparing or mixing building materials, during demolition or caulking and, above all, during overhead work, wear protective goggles as well as face masks during dusty work.
- Choose work gloves carefully. Leather gloves become wet and can facilitate burns. When working in a wet environment, cotton gloves with plastic covering (nitrile) are better. Wear gauntlet gloves during overhead work because they can considerably reduce the amount of humidity which permeates the working clothes.

2.2 Control of environmental exposure

Product characteristics

Not relevant for exposure assessment

Amounts used*

Not relevant for exposure assessment

Frequency and duration of use

Not relevant for exposure assessment

Environment factors not influenced by risk management

Default river flow and dilution

Other given operational conditions affecting environmental exposure

Indoor
Direct discharge to the wastewater is avoided.

Conditions and measures related to municipal sewage treatment plant

Default size of municipal sewage system/treatment plant and sludge treatment technique

Conditions and measures related to external treatment of waste for disposal

Not relevant for exposure assessment

Conditions and measures related to external recovery of waste

Not relevant for exposure assessment

3. Exposure estimation and reference to its source

The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and is given in parentheses below. For inhalation exposure, the RCR is based on the acute DNEL for lime substances of 4 mg/m^3 (as respirable dust) and the respective inhalation exposure estimate (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction according to EN 481.
Since limes are classified as irritating to skin and eyes a qualitative assessment has been performed for dermal exposure and exposure to the eye.

Human exposure

Handling of powder

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	small task: 0.1 µg/cm² (-) large task: 1 µg/cm² (-)	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from loading of lime substances or direct contact to the lime cannot be excluded if no protective gloves are worn during application. This may occasionally result in mild irritation easily avoided by prompt rinsing with water. Quantitative assessment The constant rate model of ConsExpo has been used. The contact rate to dust formed while pouring powder has been taken from the DIY[1]-fact sheet (RIVM report 320104007).
Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from loading of the lime substances cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	Small task: 12 µg/m³ (0.003) Large task: 120 µg/m³ (0.03)	Quantitative assessment Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above).

Application of liquid, pasty lime preparations.

Route of exposure	Exposure estimate	Method used, comments

Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes on the skin cannot be excluded if no protective gloves are worn during the application. Splashes may occasionally result in mild irritation easily avoided by immediate rinsing of the hands with water.
Eye	Splashes	Qualitative assessment If appropriate goggles are worn no exposure to the eyes needs to be expected. However, splashes into the eyes cannot be excluded if no protective goggles are worn during the application of liquid or pasty lime preparations, especially during overhead work. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	-	Qualitative assessment Not expected, as the vapour pressure of limes in water is low and generation of mists or aerosols does not take place.
Post-application exposure		
No relevant exposure will be assumed as the aqueous lime preparation will quickly convert to calcium carbonate with carbon dioxide from the atmosphere.		
Environmental exposure		
Referring to the OC/RMMs related to the environment to avoid discharging lime solutions directly into municipal wastewater, the pH of the influent of a municipal wastewater treatment plant is circum-neutral and therefore, there is no exposure to the biological activity. The influent of a municipal wastewater treatment plant is often neutralized anyway and lime may even be used beneficially for pH control of acid wastewater streams that are treated in biological WWTPs. Since the pH of the influent of the municipal treatment plant is circum neutral, the pH impact is negligible on the receiving environmental compartments, such as surface water, sediment and terrestrial compartment.		

ES number 9.13: Consumer use of CO_2 absorbent in breathing apparatuses

Exposure Scenario Format (2) addressing uses carried out by consumers	
1. Title	
Free short title	Consumer use of CO_2 absorbent in breathing apparatuses
Systematic title based on use descriptor	SU21, PC2 , ERC8b
Processes, tasks activities covered	Filling of the formulation into the cartridge Use of closed circuit breathing apparatuses Cleaning of equipment
Assessment Method*	Human health A qualitative assessment has been performed for oral and dermal exposure. The inhalation exposure has been assessed by the Dutch model (van Hemmen, 1992). Environment A qualitative justification assessment is provided.

2. Operational conditions and risk management measures	
RMM	The soda lime is available in granular form. Furthermore, a defined amount of water (14-18%) is added which will further reduce the dustiness of the absorbent. During the breathing cycle calcium dihydroxide will be quickly reacting with CO_2 to form the carbonate.
PC/ERC	**Description of activity referring to article categories (AC) and environmental release categories (ERC)**
PC 2	Use of closed circuit breathing apparatus for e.g. recreational diving containing soda lime as CO_2 absorbent. The breathed air will flow through the absorbent and CO_2 will quickly react (catalysed by water and sodium hydroxide) with the calcium dihydroxide to form the carbonate. The CO_2-free air can be re-breathed again, after addition of oxygen. Handling of the absorbent: The absorbent will be discarded after each use and refilled before each dive.
ERC 8b	Wide dispersive indoor use resulting in inclusion into or onto a matrix

2.1 Control of consumers exposure

Product characteristic

Description of the preparation	**Concentration of the substance in the preparation**	**Physical state of the preparation**	**Dustiness (if relevant)**	**Packaging design**
CO_2 absorbent	78 - 84% Depending on the application the main component has different additives. A specific amount of water is always added (14-18%).	Solid, granular	Very low dustiness (reduction by 10 % compared to powder) Dust formation cannot be ruled out during the filling of the scrubber cartridge.	4.5, 18 kg canister
"Used" CO_2 absorbent	~ 20%	Solid, granular	Very low dustiness (reduction by 10 % compared to powder)	1-3 kg in breathing apparatus

Amounts used

CO_2-Absorbent used in breathing apparatus	1-3 kg depending on the kind of breathing apparatus

Frequency and duration of use/exposure

Description of the task	**Duration of exposure per event**	**frequency of events**
Filling of the formulation into the cartridge	Ca. 1.33 min per filling, in sum < 15 min	Before each dive (up to 4 times)
Use of closed circuit breathing apparatus	1-2 h	Up to 4 dives a day
Cleaning and emptying of equipment	< 15 min	After each dive (up to 4 times)

Human factors not influenced by risk management

Description of the task	**Population exposed**	**Breathing rate**	**Exposed body part**	**Corresponding skin area [cm²]**
Filling of the formulation into the cartridge	adult	1.25 m³/hr (light working activity)	hands	840 (REACH guidance R.15, men)
Use of closed circuit breathing apparatus			-	-
Cleaning and emptying of equipment			hands	840 (REACH guidance R.15, men)

Other given operational conditions affecting consumers exposure

Description of the task	**Indoor/outdoor**	**Room volume**	**Air exchange rate**
Filling of the formulation into the cartridge	NR	NR	NR
Use of closed circuit breathing apparatus	-	-	-

Cleaning and emptying of equipment	NR	NR	NR

Conditions and measures related to information and behavioural advice to consumers

Do not get in eyes, on skin, or on clothing. Do not breathe dust
Keep container tightly closed as to avoid the soda lime to dry out.
Keep out of reach of children.
Wash thoroughly after handling.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Do not mix with acids.
Carefully read the instructions of the breathing apparatus to assure a proper use of the breathing apparatus.

Conditions and measures related to personal protection and hygiene

Wear suitable gloves, goggles and protective clothes during handling. Use a filtering half mask (mask type FFP2 acc. to EN 149).

2.2 Control of environmental exposure

Product characteristics

Not relevant for exposure assessment

Amounts used*

Not relevant for exposure assessment

Frequency and duration of use

Not relevant for exposure assessment

Environment factors not influenced by risk management

Default river flow and dilution

Other given operational conditions affecting environmental exposure

Indoor

Conditions and measures related to municipal sewage treatment plant

Default size of municipal sewage system/treatment plant and sludge treatment technique

Conditions and measures related to external treatment of waste for disposal

Not relevant for exposure assessment

Conditions and measures related to external recovery of waste

Not relevant for exposure assessment

3. Exposure estimation and reference to its source

The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and is given in parentheses below. For inhalation exposure, the RCR is based on the acute DNEL for lime substances of 4 mg/m³ (as respirable dust) and the respective inhalation exposure estimate (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction according to EN 481.
Since lime substances are classified as irritating to skin, and eyes a qualitative assessment has been performed for dermal exposure and exposure to the eye.
Due to the very specialised kind of consumers (divers filling their own CO_2 scrubber) it can be assumed that instructions will be taken into account to reduce exposure

Human exposure

Filling of the formulation into the cartridge

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	-	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from loading of granular soda lime or direct contact to the granules cannot be excluded if no protective gloves are worn during application. This may occasionally result in mild irritation easily avoided by prompt rinsing with water.
Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from loading of the granular soda lime is expected to be minimal, therefore eye exposure will be minimal even without protective goggles. Nevertheless, prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	Small task: 1.2 µg/m³ (3×10^{-4}) Large task: 12 µg/m³ (0.003)	Quantitative assessment Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form.

Use of closed circuit breathing apparatus

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	-	Qualitative assessment Due to the product characteristics, it can be concluded that dermal exposure to the absorbent in breathing apparatuses is non-existent.

Eye	-	Qualitative assessment Due to the product characteristics, it can be concluded that eye exposure to the absorbent in breathing apparatuses is non-existent.
Inhalation	negligible	Qualitative assessment Instructional advice is provided to remove any dust before finishing the assembly of the scrubber. Divers filling their own CO_2 scrubber represent a specific subpopulation within consumers. Proper use of equipment and materials is in their own interest; hence it can be assumed that instructions will be taken into account. Due to the product characteristics and the instructional advices given, it can be concluded that inhalation exposure to the absorbent during the use of the breathing apparatus is negligible.
Cleaning and emptying of equipment		
Route of exposure	**Exposure estimate**	**Method used, comments**
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Dust and splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from emptying granular soda lime or direct contact to the granules cannot be excluded if no protective gloves are worn during cleaning. Furthermore, during the cleaning of the cartridge with water contact to moistened soda lime may occur. This may occasionally result in mild irritation easily avoided by immediate rinsing of with water.
Eye	Dust and splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, contact to dust from emptying granular soda limes or during the cleaning of the cartridge with water contact to moisten soda limes may occur in very rare occasions. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation	Small task: 0.3 µg/m³ (7.5×10^{-5}) Large task: 3 µg/m³ (7.5×10^{-4})	Quantitative assessment Dust formation while pouring the powder is addressed by using the Dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form and a factor of 4 to account for the reduced amount of lime in the “used” absorbent.
Environmental exposure		
The pH impact due to use of lime in breathing apparatuses is expected to be negligible. The influent of a municipal wastewater treatment plant is often neutralized anyway and lime may even be used beneficially for pH control of acid wastewater streams that are treated in biological WWTPs. Since the pH of the influent of the municipal treatment plant is circum neutral, the pH impact is negligible on the receiving environmental compartments, such as surface water, sediment and terrestrial compartment.		

ES number 9.14: Consumer use of garden lime/fertilizer

Exposure Scenario Format (2) addressing uses carried out by consumers	
1. Title	
Free short title	Consumer use of garden lime/fertilizer
Systematic title based on use descriptor	SU21, PC20, PC12, ERC8e
Processes, tasks activities covered	Manual application of garden lime, fertilizer Post-application exposure
Assessment Method*	Human health A qualitative assessment has been performed for oral and dermal exposure as well as for the exposure to the eye. The dust exposure has been assessed by the Dutch model (van Hemmen, 1992). Environment A qualitative justification assessment is provided.

2. Operational conditions and risk management measures

RMM	No product integrated risk management measures are in place.
PC/ERC	**Description of activity referring to article categories (AC) and environmental release categories (ERC)**
PC 20	Surface spreading of the garden lime by shovel/hand (worst case) and soil incorporation. Post-application exposure to playing children.
PC 12	Surface spreading of the garden lime by shovel/ hand (worst case) and soil incorporation. Post-application exposure to playing children.
ERC 8e	Wide dispersive outdoor use of reactive substances in open systems

2.1 Control of consumers exposure

Product characteristic

Description of the preparation	**Concentration of the substance in the preparation**	**Physical state of the preparation**	**Dustiness (if relevant)**	**Packaging design**
Garden lime	100 %	Solid, powder	High dusty	Bulk in bags or containers of 5, 10 and 25 kg
Fertilizer	Up to 20 %	Solid, granular	Low dusty	Bulk in bags or containers of 5, 10 and 25 kg

Amounts used

Description of the preparation	**Amount used per event**	**Source of information**
Garden lime	100g /m^2 (up to 200g/m²)	Information and direction of use
Fertilizer	100g /m^2 (up to 1kg/m² (compost))	Information and direction of use

Frequency and duration of use/exposure

Description of the task	**Duration of exposure per event**	**frequency of events**
Manual application	Minutes-hours Depending on the size of the treated area	1 tasks per year
Post-application	2 h (toddlers playing on grass (EPA exposure factors handbook)	Relevant for up to 7 days after application

Human factors not influenced by risk management

Description of the task	**Population exposed**	**Breathing rate**	**Exposed body part**	**Corresponding skin area [cm²]**
Manual application	Adult	1.25 m³/hr	Hands and forearms	1900 (DIY fact sheet)
Post-application	Child/Toddlers	NR	NR	NR

Other given operational conditions affecting consumers exposure

Description of the task	**Indoor/outdoor**	**Room volume**	**Air exchange rate**
Manual application	outdoor	1 m³ (personal space, small area around the user)	NR
Post-application	outdoor	NR	NR

Conditions and measures related to information and behavioural advice to consumers

Do not get in eyes, on skin, or on clothing. Do not breathe dust. Use a filtering half mask (mask type FFP2 acc. to EN 149).
Keep container closed and out of reach of children.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Wash thoroughly after handling.
Do not mix with acids and always add limes to water and not water to limes.
Incorporation of the garden lime or fertilizer into the soil with subsequent watering will facilitate the effect.

Conditions and measures related to personal protection and hygiene

Wear suitable gloves, goggles and protection clothes.

2.2 Control of environmental exposure

Product characteristics

Drift: 1 % (very worst-case estimate based on data from dust measurements in air as a function of the distance from application)

Amounts used

Amount used	Ca(OH)2	2,244 kg/ha	In professional agricultural soil protection, it is

CaO	1,700 kg/ha
CaO.MgO	1,478 kg/ha
Ca(OH)2.Mg(OH)2	2,030 kg/ha
CaCO3.MgO	2,149 kg/ha
Ca(OH)2.MgO	1,774 kg/ha
Natural hydraulic lime	2,420 kg/ha

Frequency and duration of use

1 day/year (one application per year); Multiple applications during the year are allowed, provided the total yearly amount of 1,700 kg/ha is not exceeded (CaO)

Environment factors not influenced by risk management

Not relevant for exposure assessment

Other given operational conditions affecting environmental exposure

Outdoor use of products
Soil mixing depth: 20 cm

Technical conditions and measures at process level (source) to prevent release

There are no direct releases to adjacent surface waters.

Technical conditions and measures to reduce or limit discharges, air emissions and releases to soil

Drift should be minimised.

Conditions and measures related to municipal sewage treatment plant

Not relevant for exposure assessment

Conditions and measures related to external treatment of waste for disposal

Not relevant for exposure assessment

Conditions and measures related to external recovery of waste

Not relevant for exposure assessment

3. Exposure estimation and reference to its source

The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and is given in parentheses below. For inhalation exposure, the RCR is based on the long-term DNEL for lime substances of 1 mg/m^3 (as respirable dust) and the respective inhalation exposure estimate (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction according to EN 481.
Since lime substances are classified as irritating to skin and eyes a qualitative assessment has been performed for dermal exposure and exposure to the eye.

Human exposure

Manual application

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal	Dust, powder	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from application of lime substances or by direct contact to the limes cannot be excluded if no protective gloves are worn during application. Due to the relatively long application time, skin irritation would be expected. This can easily be avoided by immediate rinsing with water. It would be assumed that consumers who had experience of skin irritation will protect themselves. Therefore, any occurring skin irritation, which will be reversible, can be assumed to be non-recurring.
Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from surfacing with lime cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation (garden lime)	Small task: 12 µg/m³ (0.0012) Large task: 120 µg/m³ (0.012)	Quantitative assessment No model describing the application of powders by shovel/hand is available, therefore, read-across from the dust formation model while pouring powders has been used as a worst case. Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above).
Inhalation (fertilizer)	Small task: 0.24 µg/m³ (2.4 * 10^{-4}) Large task: 2.4 µg/m³ (0.0024)	Quantitative assessment No model describing the application of powders by shovel/hand is available, therefore, read across from the dust formation model while pouring powders has been used as a worst case. Dust formation while pouring the powder is addressed by using the dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form and a factor of 5 to account for the reduced amount of limes in fertilizer.

Post-application

According to the PSD (UK Pesticide Safety Directorate, now called CRD) post-application exposure need to be addressed for products which are applied in parks or amateur products used to treat lawns and plants grown in private gardens. In this case exposure of children, who may have access to these areas soon after treatment, needs to be assessed. The US EPA model predicts the post-application exposure to products used in private gardens (e.g. lawns) by toddlers crawling on the treated area and also via the oral route through hand-to-mouth activities. Garden lime or fertilizer including lime is used to treat acidic soil. Therefore, after application to the soil and subsequent watering the hazard driving effect of lime (alkalinity) will be quickly neutralized. Exposure to lime substances will be negligible within a short time after application.
Environmental exposure
No quantitative environmental exposure assessment is carried out because the operational conditions and risk management measures for consumer use are less stringent than those outlined for professional agricultural soil protection. Moreover, the neutralisation/pH-effect is the intended and desired effect in the soil compartment. Releases to wastewater are not expected.

ES number 9.15: Consumer use of lime substances as water treatment chemicals

Exposure Scenario Format (2) addressing uses carried out by consumers	
1. Title	
Free short title	Consumer use of lime substances as water treatment chemicals
Systematic title based on use descriptor	SU21, PC20, PC37, ERC8b
Processes, tasks activities covered	Loading, filling or re-filling of solid formulations into container/preparation of lime milk Application of lime milk to water
Assessment Method*	Human health: A qualitative assessment has been performed for oral and dermal exposure as well as for exposure of the eye. Dust exposure has been assessed by the Dutch model (van Hemmen, 1992). Environment: A qualitative justification assessment is provided.

2. Operational conditions and risk management measures

RMM	No further product integrated risk management measures are in place.
PC/ERC	**Description of activity referring to article categories (AC) and environmental release categories (ERC)**
PC 20/37	Filling and re-filling (transfer of lime substances (solid)) of lime reactor for water treatment. Transfer of lime substances (solid) into container for further application. Dropwise application of lime milk to water.
ERC 8b	Wide dispersive indoor use of reactive substances in open systems

2.1 Control of consumers exposure

Product characteristic

Description of the preparation	Concentration of the substance in the preparation	Physical state of the preparation	Dustiness (if relevant)	Packaging design
Water treatment chemical	Up to 100 %	Solid, fine powder	high dustiness (indicative value from DIY fact sheet see section 9.0.3)	Bulk in bags or buckets/containers.
Water treatment chemical	Up to 99 %	Solid, granular of different size (D50 value 0.7 D50 value 1.75 D50 value 3.08)	low dustiness (reduction by 10% compared to powder)	Bulk-tank lorry or in „Big Bags“ or in sacks

Amounts used

Description of the preparation	Amount used per event
Water treatment chemical in lime reactor for aquaria	depending on the size of the water reactor to be filled (~ 100g /L)
Water treatment chemical in lime reactor for drinking water	depending on the size of the water reactor to be filled (~up to 1.2 kg/L)
Lime milk for further application	~ 20 g / 5L

Frequency and duration of use/exposure

Description of task	Duration of exposure per event	frequency of events
Preparation of lime milk (loading, filling and refilling)	1.33 min (DIY-fact sheet, RIVM, Chapter 2.4.2 Mixing and loading of powders)	1 task/month 1task/week
Dropwise application of lime milk to water	Several minutes - hours	1 tasks/ month

Human factors not influenced by risk management

Description of the task	Population exposed	Breathing rate	Exposed body part	Corresponding skin area [cm²]
Preparation of lime milk (loading, filling and refilling)	adult	1.25 m³/hr	Half of both hands	430 (RIVM report 320104007)
Dropwise application of lime milk to water	adult	NR	Hands	860 (RIVM report 320104007)

Other given operational conditions affecting consumers exposure

Description of the task	Indoor/outdoor	Room volume	Air exchange rate
Preparation of lime milk (loading, filling and refilling)	Indoor/outdoor	1 m³ (personal space, small area around the user)	0.6 hr^{-1} (unspecified room indoor)
Dropwise application of lime milk to water	indoor	NR	NR

Conditions and measures related to information and behavioural advice to consumers

Do not get in eyes, on skin, or on clothing. Do not breathe dust
Keep container closed and out of reach of children.
Use only with adequate ventilation.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Wash thoroughly after handling.
Do not mix with acids and always add limes to water and not water to limes.

Conditions and measures related to personal protection and hygiene

Wear suitable gloves, goggles and protective clothes. Use a filtering half mask (mask type FFP2 acc. to EN 149).

2.2 Control of environmental exposure

Product characteristics

Not relevant for exposure assessment

Amounts used*

Not relevant for exposure assessment

Frequency and duration of use

Not relevant for exposure assessment

Environment factors not influenced by risk management

Default river flow and dilution

Other given operational conditions affecting environmental exposure

Indoor

Conditions and measures related to municipal sewage treatment plant

Default size of municipal sewage system/treatment plant and sludge treatment technique

Conditions and measures related to external treatment of waste for disposal

Not relevant for exposure assessment

Conditions and measures related to external recovery of waste

Not relevant for exposure assessment

3. Exposure estimation and reference to its source

The risk characterisation ratio (RCR) is the quotient of the refined exposure estimate and the respective DNEL (derived no-effect level) and is given in parentheses below. For inhalation exposure, the RCR is based on the acute DNEL for lime substances of 4 mg/m^3 (as respirable dust) and the respective inhalation exposure estimate (as inhalable dust). Thus, the RCR includes an additional safety margin since the respirable fraction is a sub-fraction of the inhalable fraction according to EN 481.
Since lime substances are classified as irritating to skin and eyes a qualitative assessment has been performed for dermal exposure and exposure to the eye.

Human exposure

Preparation of lime milk (loading)

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.
Dermal (powder)	small task: 0.1 µg/cm² (-) large task: 1 µg/cm² (-)	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, dermal contact to dust from loading of limes or direct contact to the lime cannot be excluded if no protective gloves are worn during application. This may occasionally result in mild irritation easily avoided by prompt rinsing with water. Quantitative assessment The constant rate model of ConsExpo has been used. The contact rate to dust formed while pouring powder has been taken from the DIY-fact sheet (RIVM report 320104007). For granules the exposure estimate will be even lower.
Eye	Dust	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. Dust from loading of the limes cannot be excluded if no protective goggles are used. Prompt rinsing with water and seeking medical advice after accidental exposure is advisable.
Inhalation (powder)	Small task: 12 µg/m³ (0.003) Large task: 120 µg/m³ (0.03)	Quantitative assessment Dust formation while pouring the powder is addressed by using the Dutch model (van Hemmen, 1992, as described in section 9.0.3.1 above).
Inhalation (granules)	Small task: 1.2 µg/m³ (0.0003) Large task: 12 µg/m³ (0.003)	Quantitative assessment Dust formation while pouring the powder is addressed by using the Dutch model (van Hemmen, 1992 as described in section 9.0.3.1 above) and applying a dust reduction factor of 10 for the granular form.

Dropwise application of lime milk to water

Route of exposure	Exposure estimate	Method used, comments
Oral	-	Qualitative assessment Oral exposure does not occur as part of the intended product use.

Dermal	Droplets or splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes on the skin cannot be excluded if no protective gloves are worn during application. Splashes may occasionally result in mild irritation easily avoided by immediate rinsing of the hands in water.
Eye	Droplets or splashes	Qualitative assessment If risk reduction measures are taken into account no human exposure is expected. However, splashes into the eyes cannot be excluded if no protective goggles are worn during the application. However, it is rare for eye irritation to occur as a result of exposure to a clear solution of calcium hydroxide (lime water) and mild irritation can easily be avoided by immediate rinsing of the eyes with water.
Inhalation	-	Qualitative assessment Not expected, as the vapour pressure of limes in water is low and generation of mists or aerosols does not take place.
Environmental exposure		
The pH impact due to use of lime in cosmetics is expected to be negligible. The influent of a municipal wastewater treatment plant is often neutralized anyway and lime may even be used beneficially for pH control of acid wastewater streams that are treated in biological WWTPs. Since the pH of the influent of the municipal treatment plant is circum neutral, the pH impact is negligible on the receiving environmental compartments, such as surface water, sediment and terrestrial compartment.		

ES number 9.16: Consumer use of cosmetics containing lime substances

Exposure Scenario Format (2) addressing uses carried out by consumers	
1. Title	
Free short title	Consumer use of cosmetics containing limes
Systematic title based on use descriptor	SU21, PC39 , ERC8a
Processes, tasks activities covered	-
Assessment Method*	Human health: According to Article 14(5) (b) of regulation (EC) 1907/2006 risks to human health need not be considered for substances included in cosmetic products within the scope of Directive 76/768/EC. Environment A qualitative justification assessment is provided.
2. Operational conditions and risk management measures	
ERC 8a	Wide dispersive indoor use of processing aids in open systems
2.1 Control of consumers exposure	
Product characteristic	
Not relevant, as the risk to human health from this use does not need to be considered.	
Amounts used	
Not relevant, as the risk to human health from this use does not need to be considered.	
Frequency and duration of use/exposure	
Not relevant, as the risk to human health from this use does not need to be considered.	
Human factors not influenced by risk management	
Not relevant, as the risk to human health from this use does not need to be considered.	
Other given operational conditions affecting consumers exposure	
Not relevant, as the risk to human health from this use does not need to be considered.	
Conditions and measures related to information and behavioural advice to consumers	
Not relevant, as the risk to human health from this use does not need to be considered.	
Conditions and measures related to personal protection and hygiene	
Not relevant, as the risk to human health from this use does not need to be considered.	
2.2 Control of environmental exposure	
Product characteristics	
Not relevant for exposure assessment	
Amounts used*	
Not relevant for exposure assessment	
Frequency and duration of use	
Not relevant for exposure assessment	
Environment factors not influenced by risk management	
Default river flow and dilution	
Other given operational conditions affecting environmental exposure	
Indoor	
Conditions and measures related to municipal sewage treatment plant	
Default size of municipal sewage system/treatment plant and sludge treatment technique	
Conditions and measures related to external treatment of waste for disposal	
Not relevant for exposure assessment	
Conditions and measures related to external recovery of waste	
Not relevant for exposure assessment	
3. Exposure estimation and reference to its source	
Human exposure	
Human exposure to cosmetics will be addressed by other legislation and therefore need not be addressed under regulation (EC) 1907/2006 according to Article 14(5) (b) of this regulation.	
Environmental exposure	
The pH impact due to use of lime in cosmetics is expected to be negligible. The influent of a municipal wastewater treatment plant is often neutralized anyway and lime may even be used beneficially for pH control of acid wastewater streams that are treated in biological WWTPs. Since the pH of the influent of the municipal treatment plant is circum neutral, the pH impact is negligible on the receiving environmental compartments, such as surface water, sediment and terrestrial compartment.	

End of Safety Data Sheet

APPENDIX C
Spill Contingency Plan Table of Concordance

Proponent Commitment Table of Concordance - Spill Contingency Plan						
Mitigation Name	**Reference**	**Proponent Committed Mitigation**	**Management Plan**	**Commitment Incorporated**	**Section Location**	**Notes**
Fuel Tank Farm: Spill Containment	PP Table 32-1 (YOR 2017-0211-027-1)	The fuel tank farm bund will be lined with HDPE for spill containment.	SCP; GMDP	Yes	**SCP** Section 4.4: Storage of Hazardous Materials **GMDP** Section 4.3.6: Bulk Fuel Storage Area	
Fuel Tank Farm: Spill Containment	SIR3-R3-63 (YOR 2017-0211-501-1)	All diesel storage tanks onsite that are less than 100,000 litres are double walled tanks with 100% containment. In additional all these tanks are placed in bermed HDPE lined facilities to contain minor spills during fuel transfer.	SCP; GMDP	Yes	**SCP** Section 4.4: Storage of Hazardous Materials **GMDP** Section 4.3.6: Bulk Fuel Storage Area	
Fuel Tank Farm: Spill Containment	SIR4-R4-2 (YOR 2017-0211-4259)	Fuel required for mine operations will be stored in four million litre (L) field-erected diesel tanks and up to 500,000L liquefied natural gas (LNG) bullet tanks. Fuel-dispensing equipment for mining, plant services, and freight vehicles will be located adjacent to the fuel tank bund, and the fuelling area will drain into the bund.	SCP; GMDP	Yes	**SCP** Section 4.4: Storage of Hazardous Materials; Section 4.5.2: Dispensing to Mobile Equipment **GMDP** Section 4.3.6: Bulk Fuel Storage Area	