

Town of Inuvik

Spill Contingency Plan

Prepared by:

AECOM

101 – 18817 Stony Plain Road NW 780 486 7000 tel
Edmonton, AB, Canada T5S 0C2 780 486 7070 fax
www.aecom.com

Distribution List

# Hard Copies	PDF Required	Association / Company Name
1	Y	Gwich'in Land and Water Board
10	Y	Town of Inuvik

Revision History

Revision #	Date	Revised By:	Revision Description
0	09/31/2016	Jordan Hoffart	Original Draft
1	02/06/2017	Jordan Hoffart	Revised – Includes updates to Table 1-1, info on new Water Treatment Plant

This document is provided as a basis for future updates, as information changes or becomes available.

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.



AECOM
101 – 18817 Stony Plain Road NW
Edmonton, AB, Canada T5S 0C2
www.aecom.com

780 486 7000 tel
780 486 7070 fax

February 6, 2017

Rick Campbell
Director of Public Services
Town of Inuvik
P.O. Box 1160
2 Firth Street
Inuvik, NT X0E 0T0

Dear Mr. Campbell:

Project No: 60317863

Regarding: Town of Inuvik Spill Contingency Plan - Update

Please find the enclosed update to the Report of the above referenced project. We have incorporated updated quantities of material storage, as well as provided details regarding the water treatment plant.

As this document is intended to be updated as information changes, let us know of any adjustments or comments you may have to incorporate in future updates. If there are any questions, please feel free to contact Jordan Hoffart at 780-732-9465.


Sincerely,
AECOM Canada Ltd.

Jordan Hoffart, P.Eng., PMP
Project Manager
Jordan.hoffart@aecom.com

Encl.

Quality Information

Report Prepared By:



Jordan Hoffart, P. Eng., PMP
Project Manager

Report Reviewed By:



Jason Casault, EIT
Water/Wastewater Treatment Engineer

Table of Contents

	page
1. Site and Systems Description.....	1
1.1 Hidden Lake Water Treatment Plant/Reservoir.....	1
1.2 East Channel Water Treatment Plant.....	1
1.3 Mount Baldy Solid Waste Site.....	1
1.4 Wastewater Treatment Sewage Lagoon.....	1
1.5 Community Recreation Complex – Arena and Swimming Pool.....	2
1.6 Public Works Shop.....	2
1.7 Town of Inuvik Office and Fire Station.....	2
2. Spill Contingency Plan	3
2.1 Introduction.....	3
2.2 Revisions.....	3
2.3 Purpose.....	4
2.4 Contact Information and Responsibilities	4
2.5 Off-Site Resources.....	5
2.6 Emergency Phone and Radio Locations	6
2.7 Distribution and Storage of Spill Contingency Plan	6
2.8 Community Environmental Policy.....	7
2.9 Potential Spill Materials Inventory	7
2.10 Response Flowchart	10
2.11 Action Plan	11
2.11.1 General Community Operations	11
2.11.2 Response Strategy.....	11
2.11.3 Potential Environmental Impacts of Spill.....	12
2.11.3.1 Gasoline	12
2.11.3.2 Diesel	12
2.11.3.3 Waste Oil and Miscellaneous Oils and Grease	12
2.11.3.4 Sewage	13
2.11.4 Procedures for Initial Actions.....	13
2.11.5 Spill Reporting Procedures.....	13
2.11.6 Procedures for Protection of Human Health and Safety.....	14
2.11.7 Procedures for Containing and Controlling Spills.....	14
2.11.8 Procedures for Transferring, Storing and Managing Spill Related Wastes.....	15
2.11.9 Procedures for Restoring Affected Areas	15
2.12 Resource Inventory.....	15
2.13 Training.....	16

List of Figures

Figure 1.1: Facility Locations.....	2
Figure 2.1: Spill Response Flowchart	10

List of Tables

Table 2-1: Revision History	3
Table 2-2: Responsibility for Facility Spill Contingency Plan.....	4
Table 2-3: Hidden Lake Water Treatment Plant/Reservoir	7
Table 2-4: East Channel Water Treatment Plant.....	7
Table 2-5: Mount Baldy Solid Waste Site.....	7
Table 2-6: Wastewater Treatment Sewage Lagoon	8
Table 2-7: Community Recreation Complex - Arena and Swimming Pool.....	8
Table 2-8: Public Works Shop	8
Table 2-9: Town of Inuvik Office and Fire Station.....	9

Appendices

- Appendix A. Immediately Reportable Spill Quantities
- Appendix B. Spill Report Form
- Appendix C. Safety Data Sheets (SDS)

1. Site and Systems Description

The Town of Inuvik utilizes many municipal facilities to carry out the water and sewer servicing needs, waste collection, recreation and operations and maintenance. The facilities supporting these Town functions and systems are described below.

1.1 Hidden Lake Water Treatment Plant/Reservoir

The Hidden Lake Water Treatment Plant (WTP) operated until November of 2016. The Hidden Lake WTP was a seasonal (summer) source which would draw water from Hidden Lake for treatment prior to discharge into the adjacent steel reservoir tank for storage. The steel reservoir tank for storage is still in use to assist with storage for the water needs of the Town. The treated water in the storage tank is connected to the distribution system for supply of the Town. Hazardous materials on site were housed in the pump house where treatment occurred.

1.2 East Channel Water Treatment Plant

The Town of Inuvik has recently completed upgrades to the East Channel Water Treatment Plant (WTP). This new WTP and a new water intake off the East Channel replaces both the previous seasonal (winter) East Channel operations as well as the seasonal (summer) Hidden Lake WTP. The new East Channel WTP includes operations for flocculation, filtration and ultra violet treatment, and requires use of chlorine, fluoride, flocculants and other materials. Hazardous materials on site are housed in application and areas within the WTP.

1.3 Mount Baldy Solid Waste Site

Waste is collected on a weekly basis throughout the Town and disposed at Inuvik's Solid Waste Disposal Facility near Mount Baldy. It is currently the only waste disposal site operated by the Town, and typically only collects domestic waste collected in Town. There are no hazardous materials or fuels stored at the solid waste site other than typical household hazardous wastes.

1.4 Wastewater Treatment Sewage Lagoon

The sewage lagoon is located in the north east part of Town adjacent to the East Channel. There are two sludge and two primary cells for treatment prior to discharging to a large storage cell. Access to the lagoon is through a locked gate on a gravel road. There are no hazardous materials or fuels stored at the wastewater sewage lagoon. Sewage and sludge are exempt from 2(1)(b) of the NWT *Consolidation of Spill Contingency Planning and Reporting Regulations*.

1.5 Community Recreation Complex – Arena and Swimming Pool

The Town's Recreation Complex, the Midnight Sun Recreation Complex, is located at the intersection of Bompas Street and Gwich'in Road. The Complex houses the community arena and swimming pools, both of which use a number of chemicals, housed within the maintenance areas of the building. A 10,000 liter double walled diesel tank is on site as well.

1.6 Public Works Shop

The Public Works Shop is located on Veteran's Way, and is used for vehicle storage and maintenance operations. Various chemicals are housed at the Public Works Shop.

1.7 Town of Inuvik Office and Fire Station

The Town of Inuvik office building is located on Firth Street, and adjoins the Town Fire Station. Hazardous materials primarily for the Fire Station maintenance and operations are housed in the Fire Station garage area.

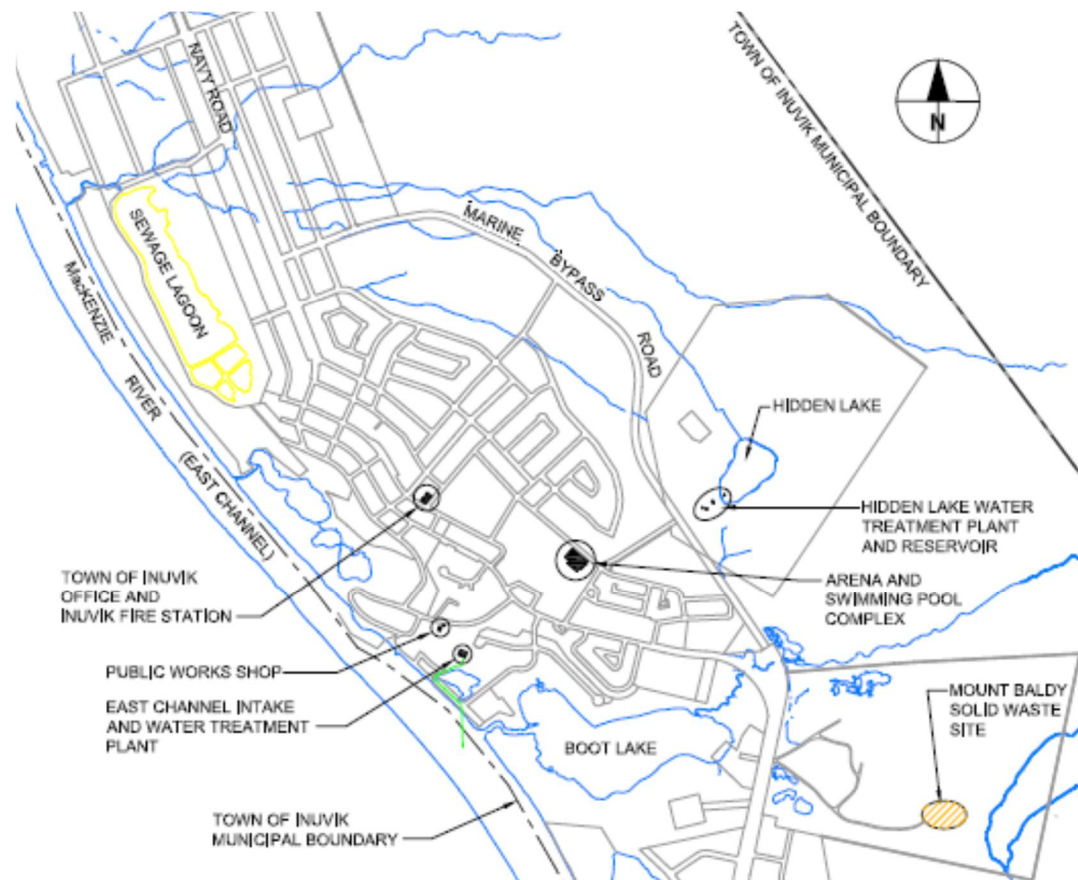


Figure 1.1: Facility Locations

2. Spill Contingency Plan

2.1 Introduction

Effective date of Spill Contingency Plan: **October 1, 2016**

This Spill Contingency Plan is effective from the date shown above until such time that an updated contingency plan is in place. Updated plans should document changes and revision dates under Section 2.2.

This plan applies to all operations and activities conducted within the municipal boundaries of the Town of Inuvik. This Spill Contingency Plan is in accordance with the *MVLWB/GNWT Operation and Maintenance Plan Templates for Municipal Water Licences: Spill Contingency Plan*, developed to comply with the Environmental Protection Act, R.R.N.W.T. 1990,c.

2.2 Revisions

This Spill Contingency Plan should be updated annually at a minimum, or when required due to operation changes.

Table 2-1: Revision History

Date of Revision	Title, Section Number, or Page Number of Revised Sections	Summary of Changes
2016/09/30	N/A	First Submission – Issued For Review
2017/01/27	N/A	Second Submission – Issued For Review, updated for changes to material quantities

2.3 Purpose

The purpose of this plan is to outline response actions for potential spills of any size, including a worst case scenario, for the Town of Inuvik. The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to a spill.

It is the policy of the Town of Inuvik:

- To comply with existing regulations
- To provide such protection of the environment as it is technically feasible and economically practical
- To cooperate with other groups on the protection of the environment
- To keep employees, government officials, and the general public informed

2.4 Contact Information and Responsibilities

An immediately reportable spill is defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes shown in the attached table. These spills must be reported to the NWT 24-hour Spill Report Line at (867) 920-8130.

The following contact information outlines the Town of Inuvik spill response personnel:

Senior Administrative Officer (SAO):

Name: Grant Hood
Phone: (867) 777-8608

Director of Public Services:

Name: Rick Campbell
Phone: (867) 777-8615

Public Services Water and Sewer After Hours:

Phone: (867) 678-5384

All media inquiries should be directed to the SAO contact information as provided above. Additional copies of the Spill Contingency Plan may be obtained by contacting the SAO as well.

Table 2-2: Responsibility for Facility Spill Contingency Plan

Facility	Name	Job Title	Phone
Hidden Lake Water Treatment Plant/Reservoir	Rick Campbell	Director of Public Services	(867) 777-8615
East Channel Water Treatment Plant	Rick Campbell	Director of Public Services	(867) 777-8615

Facility	Name	Job Title	Phone
Mount Baldy Solid Waste Site	Rick Campbell	Director of Public Services	(867) 777-8615
Wastewater Treatment Sewage Lagoon	Rick Campbell	Director of Public Services	(867) 777-8615
Community Recreation Complex – Arena and Swimming Pool	Barry Setzer	Recreation Facilities Foreman	(867) 777-8627
Public Works Shop	Rick Campbell	Director of Public Services	(867) 777-8615
Town of Inuvik Office and Fire Station	Rick Campbell	Director of Public Services	(867) 777-8615

2.5 Off-Site Resources

Off-site resources for assistance in the event of a spill are listed below. Assistance from outside the Town of Inuvik may not be able to reach the site until at least the next business day.

- NWT 24-Hour spill line (867) 920-8130
- GNWT Environmental Protection Division (867) 873-7654
- ENR Inspector Inuvik Region (867) 678-0590
- AANDC Northwest Territories Region (867) 669-2440
- Environment Canada (Emergency) Yellowknife (867) 669-4725
- GNWT Environmental Health Officer (867) 669-8979
- RCMP (Yellowknife) (867) 669-1111
- Stanton Territorial Health Authority (867) 669-4111
- Dehcho Health & Social Services Authority (867) 695-3815
- Medivac (Yellowknife) (867) 669-4115
- Great Slave Helicopters (Yellowknife) (867) 873-2081
- Matrix Helicopters (Yellowknife)..... (867) 766-3134
- Trinity Helicopters (Yellowknife)..... (867) 669-7031
- Remote Helicopters (Hay River) (867) 874-6999
- Thebacha Helicopters (Fort Smith) (867) 872-4354
- Air Tindi (Yellowknife) (867) 669-8218
or 669-8200
- Arctic Sunwest Charters (Yellowknife) (867) 873-4464

2.6 Emergency Phone and Radio Locations

Phones for use in emergency are available at the Town of Inuvik office location on Firth Street.

2.7 Distribution and Storage of Spill Contingency Plan

A copy of this Spill Contingency Plan is to be kept on site at each facility building, where applicable. This includes the following locations where buildings are present:

- Hidden Lake Water Treatment Plant/Reservoir
- East Channel Water Treatment Plant
- Community Recreation Complex
- Public Works Shop
- Town of Inuvik Office and Fire Station

Distribution of this Spill Contingency Plan includes:

Gwitch'in Land and Water Board
P.O. Box 2018
Inuvik, NT X0E 0T0
Phone: 867-777-4954
Fax: 867-777-2304

MACA Inuvik Regional Office
Bag Service No. 1
43 Distributor Street
Inuvik, NT X0E 0T0
Phone: 867-777-7121
Fax: 867-777-7352
Toll Free: 1-877-777-3322

PWS Inuvik Regional Office
Bag Service No. 1
Inuvik, NT X0E 0T0
Phone: 867-777-7140
Fax: 867-777-3463

Beaufort-Delta Health and Social Services Authority
Bag Service No. 2
285 – 289 Mackenzie Road
Inuvik, NT X0E 0T0
Phone: 867-777-8000

2.8 Community Environmental Policy

The Town of Inuvik is committed to operating in an environmentally sensitive manner, and complying with the requirements of the Gwich'in Land and Water Board.

2.9 Potential Spill Materials Inventory

Table 2-3: Hidden Lake Water Treatment Plant/Reservoir

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
Sodium Hypochlorite (bleach)	4L Jugs	8	12	Shelf in pump building, for emergency disinfection use only
Hydrochloric Acid	4L Jugs	1	12	Shelf in pump building, for disinfection use

Table 2-4: East Channel Water Treatment Plant

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
Sodium Hydroxide	1 cu.m. tote (1230 kg)	4	4	Water treatment processes located in WTP room for dosing operations
Chlorine	68 kg Cylinder	16	16	Water treatment processes located in WTP chlorine room for dosing operations
Fluoride	55 gallon drum	10	10	Water treatment processes located in WTP fluoride room for dosing operations
Coagulant	1 cu.m. tote (1230 kg)	18	18	Water treatment processes located in WTP area for dosing operations near filtration units
Flocculation Polymer	Dry form	n/a	n/a	Water treatment processes located in WTP area for dosing operations near injection tank

Table 2-5: Mount Baldy Solid Waste Site

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
N/A				

Table 2-6: Wastewater Treatment Sewage Lagoon

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
N/A				

Table 2-7: Community Recreation Complex - Arena and Swimming Pool

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
Cal disc 320 (Calcium Hypochlorite)	25kg	32	32	Located in Pool, used for pool water treatment
C-Clear	4L Jugs	8	8	Located in Pool, used for anti-fog treatment
Metasol	4L Jugs	7	8	Located in Pool, used for cleaning
Spa Boss	4L Jugs	3	8	Located in Pool, used for pool water treatment
77Plus (Citric Acid)	4L Jugs	6	8	Located in Pool, used for cleaning
Sodium Thiosulphate	22.7kg	3	3	Located in Pool, used after superchlorination to reduce chlorine levels
Oxyout	50kg	1	1	Located in Pool, used for corrosion treatment
Muratic Acid	4L Jugs	3	8	Located in Pool, used for pH adjustment
Sodium Biosulphate	25kg	15	15	Located in Pool, used to lower pH of pool
Ammonia	45.46kg Cylinder	8	8	Located in Arena, used in ice making plant
Caustic Soda (Sodium Hydroxide)	8kg	1	2	Located in Arena, used for pH adjustment
Calcium Chloride Beads	25kg	51	60	Located in Arena, used to increase water hardness and reduce concrete erosion
Diesel	10,000L Double Wall Tank	1	1	Located in Arena, used for boiler supply

Table 2-8: Public Works Shop

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
Polyaluminum Chloride	Tote	16	20	Located in Workshop, used for water treatment
Sodium hydroxide solution	Tote	16	20	Located in Workshop, used for pH adjustment
Hydrofluorosilicic Acid	Barrel	20	20	Located in Workshop, used for water fluoridation

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
12 - 68kg. cylinders of chlorine gas	68kg Cylinder	12	12	Located in Workshop, used for potable water treatment disinfection
1 barrel of 100% glycol	Barrel	1	1	Located in Workshop
Fluoride reagents	Package (25 vials per)	22	25	Located in shop, used for fluoride reagent
Nitric Acid	Vial	54	75	Located in shop, used for pH adjustment
Sulphuric Acid	Vial	21	75	Located in shop, used for pH adjustment
Sodium Hydroxide	Vial	8	75	Located in shop, used for pH adjustment

Table 2-9: Town of Inuvik Office and Fire Station

Material	Type of Storage Container	Quantity Normally Onsite	Maximum Quantity Onsite	Storage Location and Uses
High Combat Foam	5 Gallon Barrel	10	12	Located in Fire Station, used for fire suppression
Antifreeze	4L Jug	8	10	Located in Fire Station, used for vehicle maintenance
Paints	Paint Can, various sizes			Located in Fire Station, used for general maintenance
Various Lube/Motor Oils	Canister, various types and sizes			Located in Fire Station, used for vehicle maintenance
Windshield washer Fluid	4L Jug			Located in Fire Station, used for vehicle maintenance
Diesel Exhaust Fluid	4L Jug	4	5	Located in Fire Station, used for vehicle maintenance
Glycol	4L Jug	2	4	Located in Fire Station, used for smoke simulation

2.10 Response Flowchart

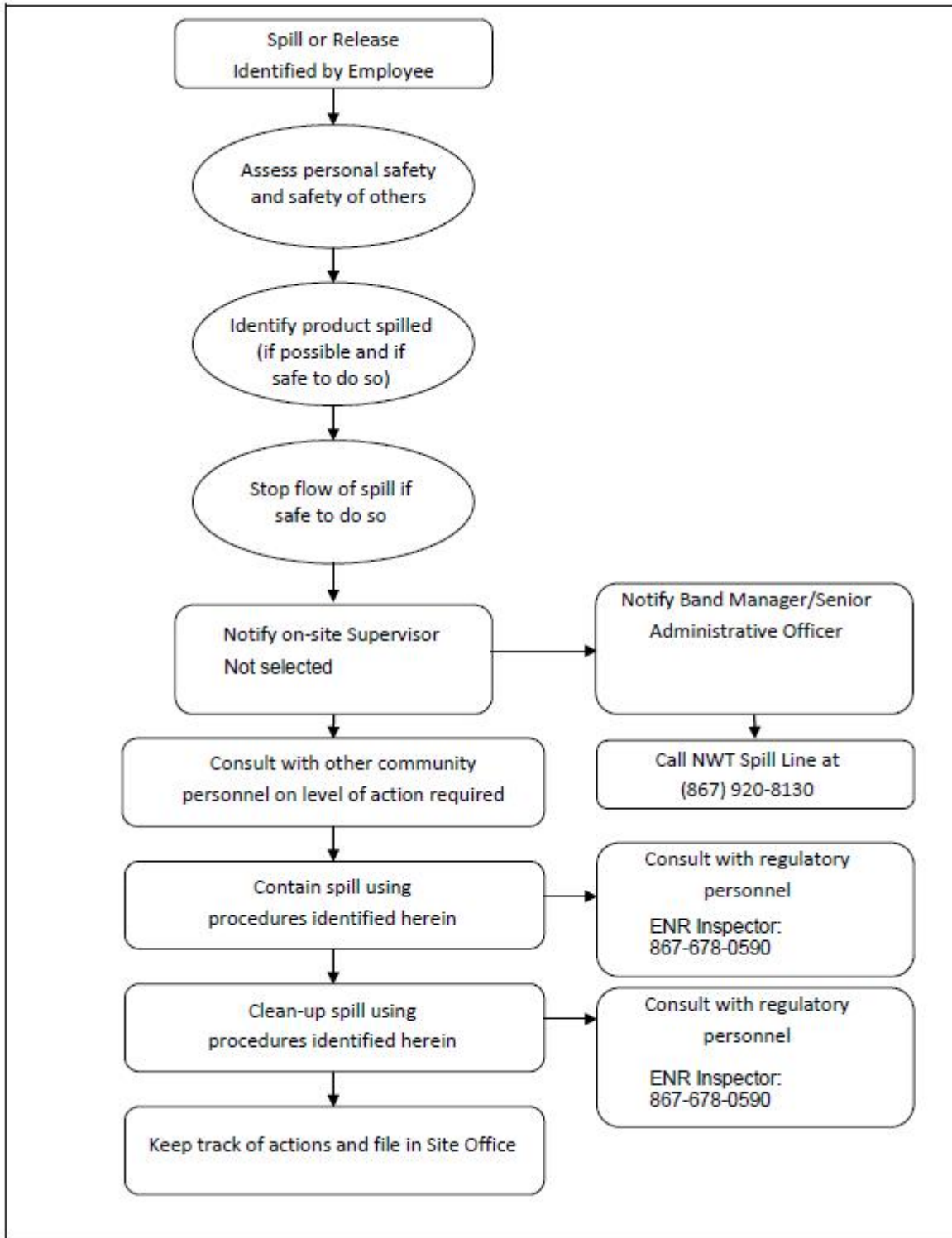


Figure 2.1: Spill Response Flowchart

2.11 Action Plan

2.11.1 General Community Operations

On a daily basis the community conducts operations that have the potential to be a small spill situation. Reporting for these spills will be in accordance with the Environmental Protection Act and the volumes outlined in the list of Immediately Reportable Spill Quantities in Appendix A.

Defensive Spill Position

General community operations include:

- Retain sufficient supplies (sorbent) in community-owned buildings and potential spill locations to contain potential spill volumes. Such as motor oil generated from servicing vehicles, gasoline and diesel from the fuelling of equipment.
- Using Storage tanks that meet the fire code and Fire Marshal's recommendations (Dyked tanks or double-walled).
- Training personnel in safe, sensible operational procedures.
- Retain minimum economic volumes of chlorine and other chemicals in the community's possession to reduce the size of a potential spill.
- Retain Safety Data Sheets (SDS) for all chemicals in use.

2.11.2 Response Strategy

In the event of a spill:

- Be alert and consider safety first. If possible, identify the product spilled and the source of the spill.
- Assess the fire and safety hazard to human life; warn people in and around the spill area to vacate the area if necessary
- Shut off the source of the spill, if safe to do so.
- Shut off all machinery or equipment, for example: lights, motors, furnaces, truck engines that may cause sparks, etc. to start a fire, no smoking.
- Tend to the injured, if any.
- Secure the area by not letting any vehicles or persons enter the area.
- Use good judgment to safely stop the spill product from spreading, if possible, by creating a barrier to keep the area of spill from getting larger
- Notify the SAO/Acting SAO that a spill has occurred. The SAO will follow these steps:
 - Step 1: Activate the Spill Recovery Plan.
 - Step 2: Consult with on-site staff and determine appropriate level of response.
 - Step 3: Notify all relevant government departments using the 23-hour Spill Line.
 - Step 4: Deploy appropriate staff resources, including Rubber Tire Loader, Municipal Works staff, Spill Containment Kit located as listed in Section 2.13.
 - Step 5: Commence spill containment and collection activities.
 - Step 6: See that the contaminated materials are disposed within the solid waste disposal area.
 - Step 7: Complete spill report.

Note: Specific chemicals have specific spill containment requirements; the SDS for these chemicals identify the procedure for its collection. See Appendix C.

2.11.3 Potential Environmental Impacts of Spill

Generally, for the hazardous materials discussed below, environmental impacts are lower during the winter, as snow is a natural sorbent and ice forms a barrier lining for eliminating soil or water contamination. Spills can be more readily recovered when identified and reported.

2.11.3.1 Gasoline

Environmental Impacts:

- Harmful to wildlife and aquatic life
- Not readily biodegradable
- Has potential to bioaccumulate in environment
- Volatilizes easily
- Runoff into water bodies must be avoided

Worst Case Scenario: Fuel truck spill and contents pour onto ground and surrounding environment.

2.11.3.2 Diesel

Environmental Impacts:

- Harmful to wildlife and aquatic life
- Not readily biodegradable
- Has potential to bioaccumulate in environment
- Burns slowly, more readily contained than volatile fuels
- Runoff into water bodies must be avoided

Worst Case Scenario: Fuel truck spill and contents pour onto ground and surrounding environment.

2.11.3.3 Waste Oil and Miscellaneous Oils and Grease

Environmental Impacts:

- Harmful to wildlife and aquatic life
- Not readily biodegradable
- Has potential to bioaccumulate in environment
- Runoff into water bodies must be avoided

Worst Case Scenario: All oil and waste oil containers simultaneously spill and contents pour onto ground and surrounding environment.

2.11.3.4 Sewage

Environmental Impacts:

- Human health hazard and unsightly appearance
- High nutrient concentrations could negatively impact water bodies and runoff into water bodies must be avoided.

Worst Case Scenario: Sewage trucks, containers or sewer main spill and contents pour onto ground and surrounding environment.

2.11.4 Procedures for Initial Actions

The following list of actions should be followed by the first person on the scene:

- Ensure safety of all personnel
- Identify the product spilled
- Assess the hazards and risks to persons in the vicinity of the spill
- Remove all sources of ignition
- If possible, without further assistance, control the danger to human life
- If it is safe to do so, and if possible, stop the spill (i.e. shut off pump, replace cap, tip drum upward, etc.)
- Gather information on the status of the situation, including:
 - Estimated size of spill
 - Estimated migration route
- Contact the on-site Supervisor.

2.11.5 Spill Reporting Procedures

Spills should be reported immediately to the onsite Supervisor, who will notify the SAO. The SAO will determine if the spill is to be reported to the NWT 24-Hour Spill Line at (867) 920-8130, based on the volumes in the Immediately Reportable Spill Quantities table in Appendix A.

Copies of the Spill Report form are available in each spill kit and in Appendix B. The form will be filled out by the onsite Foreman (or designate), and faxed or emailed to the NWT Spill Line. Contact information is as follows:

NWT 24-Hour Spill Line
Phone: (867) 920-8130
Fax: (867) 873-6924
Email: spills@gov.nt.ca

2.11.6 Procedures for Protection of Human Health and Safety

Following a spill, the health and safety of workers as well as the general public is a priority. Actions taken will depend on the type of spill.

- In the event of a chemical spill: Restrict public access to the spill area. Workers involved in the clean-up of the spill should wear personal protective equipment (PPE).
- In the event of a flammable or combustible material spill: Disconnect electrical equipment, evacuate adjacent buildings and restrict public access to the spill area. Only spark-arresting equipment should be used during clean-up of the spill. PPE should also be worn by workers involved in the clean-up.
- In the event of a sewage spill: Restrict public access (including pets and animals) to the spill area.

2.11.7 Procedures for Containing and Controlling Spills

General procedures noted below will be used to contain and control all spills. Specific procedures for spills on land, water, snow and ice follow.

- First anticipate what will be affected by the spill.
- Assess direction and speed of spill, and any factors that could affect these (water, wind, and slope).
- Determine best location for containing spill, avoiding any water bodies.

Containment of Spills on Land:

Dykes and trenches can be constructed to contain spills on land. Soil surrounding the spill area can be dug out, and piled up, to create a barrier for the spill. A plastic tarp can be placed at the base of the dyke, so that the pooled material can be removed with sorbent materials. Conversely, trenches can be excavated to permafrost, which will provide a natural containment of the spill. Once the material is contained, it can be pumped out, or removed by using sorbent materials. If the spill is moving very slowly, such structures may not be necessary and the material can be removed before migrating away from the spill location.

Containment of Spills on Water:

Spills on water are considered the most serious types of spills, as there is often no containment of the spilled material and water quality and aquatic life are negatively impacted. Booms, weirs, sediment curtains and fencing can be installed to contain the spill. Booms are designed to float, and are made of absorbent material to soak up the spilled fuel. They are deployed from the shore or a boat, to create a circle around the spill or to contain a spill from migrating further into the receiving water bodies. Weirs are installed across creeks/drainages, to prevent further migration. Plywood or other materials found onsite can be used. Barriers made of fence or netting can be used as well, with sorbent material placed at the base of the barrier. Once contained, the fuel can be removed by absorbent materials, pumped out or allowed to volatilize.

Containment of Spills on Snow:

Snot acts as a natural sorbent for spilled fuel. Impacted snow is easily visible, and can be shoveled into empty drums or barrels for proper disposal. If the spill is migrating down a hill, a snow dyke can be constructed to contain the spill. A plastic tarp can be placed at the base of the dyke, where spilled fuel is expected to pool. The collected fuel and impacted snow can be removed with absorbent materials, pumped out, or shoveled into barrels for disposal.

Containment of Spills on Ice:

Ice is considered impermeable to fuel, so these spills are generally easy to clean up. Small spills can be cleaned up by placing absorbent materials on top of the ice. Impacted snow and slush can then be removed by shovels, and placed in barrels for disposal. For larger spills, dyes of snow and trenches can be constructed to contain the spill. Pooled fuel can then be removed by absorbent materials or pumped out. Impacted snow and slush can be shoveled into barrels for disposal.

Worst Case Scenarios:

Worst case scenarios include a dyke or trench overflowing and a large spill on water that cannot be contained with materials available in the community. In the first case, a trench or collection pit could be constructed downstream to collect the fuel. In the second case, an emergency response team would need to be called, with appropriate equipment to deal with the spill.

2.11.8 Procedures for Transferring, Storing and Managing Spill Related Wastes

Spills are generally cleaned up starting at the outer limit of the spill, and working towards the point of the spill. Sorbent materials and hand tools such as cans and shovels are used for smaller spills. Larger spills can be contained with the use of a pump and/or heavy equipment.

Spill wastes include used absorbent materials and containers of impacted water and snow. Sorbent materials should be placed in plastic bags for proper disposal. The containers of impacted water and snow should be sealed and stored until disposal at an approved facility can be arranged. For most of the containment procedures, spilled petroleum products and materials used for containment will be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

Following a spill, all used materials need to be properly washed and/or replaced.

2.11.9 Procedures for Restoring Affected Areas

Once a spill has been contained, community personnel will consult with the Inspector assigned to the file to determine the level of clean-up required. The Inspector may request that a site specific study be conducted, to ensure appropriate clean-up levels are met.

After clean-up has been completed, the community should follow up with the NWT 24-hour Spill Line to ensure that the spill report file has been closed. Closure of the spill file provides evidence that the spill was cleaned up to the regulator's satisfaction. This will help prevent the spill from being considered an environmental liability for the community in the event of a change of ownership, refinancing, or closure of the site. A copy of the spill report marked "Closed" can be provided on request for the community's files. The Spill Line also keeps copies of these reports on file.

2.12 Resource Inventory

The Town of Inuvik is equipped with minimal earth-moving equipment for larger spills. The Town does have a skid-steer loader should smaller spill containment be required, but would have to contract out larger equipment if needed.

For small spills, shovels, tools, and absorbent materials are typically available in work trucks used by public works staff, with additional inventory found at the Town Office, Recreation Complex and the Public Works Shop. A spill kit of appropriate capacity should be located at the Water Reservoir.

2.13 Training

The Town of Inuvik public works operations and maintenance staff are trained in WHMIS and First Aid, with records of training kept at the Town office.

The Department of Environment and Natural Resources schedules a few training sessions each year for spill contingency. Training will be conducted on an as-needed basis for each facility and representative staff.

AECOM

Appendix A

**Immediately Reportable
Spill Quantities**

Hazardous waste information

Asbestos: Exposed asbestos fibres from construction and demolition debris present a risk to human health. The risks to human health are lowered to safe levels when asbestos is properly packaged according to the conditions set by the Worker Safety and Compensation Commission. Once this has taken place, a hole must be dug in advance of acceptance and the asbestos needs to be buried immediately. The location needs to be documented to prevent future disturbance. Further details can be found in ENR's document *Guideline for the Management of Waste Asbestos* (attached).

Lead-acid batteries are commonly found in vehicles. Both the lead and the acid are contaminants. Batteries in good condition can be stacked on pallets and banded or shrink-wrapped for transportation when enough have been collected to make shipping worthwhile. Store broken batteries in a pail or other container to prevent spills and avoid contact with battery acid. Further details can be found in ENR's document *Guideline for the Management of Waste Batteries* (attached).


Glycols: Waste antifreeze (Ethylene Glycol) is generated from vehicle maintenance. Propylene glycol is more common to the industrial/commercial sector where it is used for heating larger buildings. Glycols can be stored in pails or drums until the quantity warrants shipping. Further details can be found in ENR's document *Guideline for the Management of Waste Antifreeze* (attached).

Hydrocarbon-contaminated soil, snow, and water that result from spills or contaminated sites are managed as a hazardous waste in the NWT. Hydrocarbons include diesel, heating oil, gasoline, and other petroleum products. Communities wanting to store or treat contaminated soil, snow, or water may need to amend their water licence. Contact ENR for guidance on developing appropriate facilities.

Mercury is a severely toxic contaminant. Disposal needs to be reduced to levels as low as reasonably achievable. Thermostats, thermometers, mercury switches and fluorescent lamps all contain mercury. They can be safely stored in clearly marked pails. Drum-top crushing equipment can be used to remove the mercury from fluorescent bulbs. Other types of mercury-containing lights (i.e. street lamps or high intensity discharge lamps from the industrial/commercial sector) require specialized disposal methods and usually need to be transported to southern receiving facilities. For further information, see ENR's document *Guide to Recycling Mercury-Containing Lamps* (attached).

Oily debris can consist of rags, sorbent material, or containers used to store or clean up oil. These materials are contaminants that cannot be added to a typical soil treatment facility, but need to be kept segregated from other waste.

Ozone depleting substances (ODS), also referred to as halocarbons, are chemicals mainly used in air conditioning and refrigeration equipment. The release of these substances depletes the ozone layer and is prohibited. Refrigerants need to be recovered by a trained technician prior to disposal of items containing refrigerants, including refrigerators, freezers and vehicles. Specific training is required for anyone servicing equipment containing ODSs and halocarbon alternatives. For more information, see ENR's document *Environmental Guideline for Ozone Depleting Substances (ODS's) and Halocarbon Alternatives* (attached).



Paint: Paint can contain a number of hazardous chemicals, including lead. Whenever possible, paint should be used rather than disposed of. If it can't be used, the disposal method depends on the type of paint (check the label). Oil-based paint should be stored in approved 205 litre drums, ready for shipping. Latex paints can be landfilled after they are completely dried out (they can be spread out on a board or sheet to dry). Industrial/commercial paints usually need specialized treatment methods and should not be collected at the community SWF. Check ENR's document *Guideline for the Management of Waste Lead and Lead Paint* (attached) for more information.

Propane tanks and aerosol cans are regulated as a dangerous good and are a potential explosion hazard at all times. Propane tanks can be returned to the retailer or supplier for safe storage and transport. Trained staff can safely evacuate the propane gas, making the tanks safe for scrap metal. Large propane tanks and other compressed gas canisters from the industrial/commercial sector should not be collected at the community SWF.

Residue Fuel Tanks / Heating Oil Tanks / Residue Drums: Fuel storage tanks and drums often contain residue (e.g. sludge at the bottom), or may still contain flammable vapours. Tanks must be properly emptied prior to disposal as scrap metal. Empty drums need to be stored on their sides to prevent water from accumulating.

Used oil can be used as feedstock for a used oil furnace if the testing and other conditions in the *Used Oil and Waste Fuel Management Regulations Plain Language Guide* (attached) are met. Used oil can be stored in clearly labelled good quality tanks or drums. Do not let drums or pails be contaminated with glycol or solvents. Do not accept excessive volumes from the industrial/commercial sector.

Waste Fuel: Residents generate waste fuel from the use of gas-powered equipment and need a local disposal option. Waste fuel from residents can be bulked into UN-approved steel drums at Household Hazardous Waste collection events, or on a daily basis. The decision to accept waste fuel from residents on a daily basis requires appropriate screening methods to screen out incompatible materials from residents and excessive volumes of fuel or solvents from the industrial/commercial/institutional sector.

Vehicles: End-of-life vehicles contain antifreeze, batteries, fuel, mercury switches and other lubricating fluids that are considered hazardous waste and need to be removed. Once the hazardous materials are removed, the rest of the vehicle can be treated as scrap metal. Refrigerants from air conditioning systems will need to be removed by a trained technician.

Immediately Reportable Spill Quantities

TDG Class	Substance for NWT 24 Hour Spill Line	Immediately Reportable Quantities
1	Explosives	Any amount
2.3	Compressed gas (toxic)	
2.4	Compressed gas (corrosive)	
6.2	Infectious substances	
7	Radioactive	
None	Unknown substance	
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	
3.1	Flammable liquids	> 100 L
3.2		
3.3		
4.1	Flammable solids	> 25 kg
4.2	Spontaneously combustible solids	
4.3	Water reactant	
5.1	Oxidizing substance	> 50 L or 50 kg
9.1	Miscellaneous products or substances excluding PCB mixtures	
5.2	Organic peroxides	> 1 L or 1 kg
9.2	Environmentally hazardous	
6.1	Poisonous substances	> 5 L or 5 kg
8	Corrosive substances	
9.3	Dangerous wastes	
9.1	PCB mixtures of 5 or more ppm	> 0.5 L or 0.5 kg
None	Other contaminants (e.g., crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, waste water, etc.)	> 100 L or 100 kg
None	Sour natural gas (i.e., contains H ₂ S), sweet natural gas	Uncontrolled release or sustained flow of 10 min or more

Note: In addition, all releases of harmful substances, regardless of quantity, are to be reported to the NWT spill line if the release is near or into a water body, is near or into a designated sensitive environment or sensitive wildlife habitat, poses imminent threat to human health or safety, poses imminent threat to a listed species at risk or its critical habitat, or is uncontrollable.

Source: AANDC, *Guidelines for Spill Contingency Planning*. April 2007

AECOM

Appendix B

Spill Report Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND
OTHER HAZARDOUS MATERIALS



NT-NU 24-HOUR SPILL REPORT LINE

Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date: MM DD YY	Report Time:	<input type="checkbox"/> Original Spill Report OR <input type="checkbox"/> Update # _____ to the Original Spill Report	Report Number:	
	Occurrence Date: MM DD YY	Occurrence Time:			
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):		
D	Geographic Place Name or Distance and Direction from the Named Location:		Region: <input type="checkbox"/> NT <input type="checkbox"/> Nunavut <input type="checkbox"/> Adjacent Jurisdiction or Ocean		
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds		
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:		
G	Any Contractor Involved:		Contractor Address or Office Location:		
H	Product Spilled: <input type="checkbox"/> Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:		
I	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:		
J	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:		
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:				
L	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:
Lead Agency: <input type="checkbox"/> EC <input type="checkbox"/> CCG/TCMSS <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> AANDC <input type="checkbox"/> NEB <input type="checkbox"/> Other: _____			Significance: <input type="checkbox"/> Minor <input type="checkbox"/> Major <input type="checkbox"/> Unknown		File Status: <input type="checkbox"/> Open <input type="checkbox"/> Closed
Agency:		Contact Name:	Contact Name:	Remarks:	
Lead Agency:					
First Support Agency:					
Second Support Agency:					
Third Support Agency:					



AECOM

Appendix C

Safety Data Sheets (SDS)

Material Safety Data Sheet



Ammonia

Section 1. Chemical product and company identification

Product name	: Ammonia
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	: Synthetic/Analytical chemistry.
Synonym	: ammonia; anhydrous ammonia; Aqueous ammonia; Aqua ammonia
MSDS #	: 001003
Date of Preparation/ Revision	: 4/3/2014.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Gas. [Compressed gas.] DANGER! CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CONTENTS UNDER PRESSURE. Do not puncture or incinerate container. Do not breathe gas. Do not get on skin or clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container closed. Do not get in eyes, on skin or on clothing. Avoid breathing gas. Wash thoroughly after handling. Contact with rapidly expanding gases can cause frostbite.
Target organs	: May cause damage to the following organs: lungs, upper respiratory tract, skin, eyes.
Routes of entry	: Inhalation Dermal Eyes
<u>Potential acute health effects</u>	
Eyes	: Severely corrosive to the eyes. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
Skin	: Severely corrosive to the skin. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	: Severely corrosive to the respiratory system.
Ingestion	: Ingestion is not a normal route of exposure for gases
<u>Potential chronic health effects</u>	
Chronic effects	: May cause target organ damage, based on animal data.
Target organs	: May cause damage to the following organs: lungs, upper respiratory tract, skin, eyes.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
See toxicological information (Section 11)	

Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Ammonia	7664-41-7	100	<p>ACGIH TLV (United States, 6/2013). STEL: 24 mg/m³ 15 minutes. STEL: 35 ppm 15 minutes. TWA: 17 mg/m³ 8 hours. TWA: 25 ppm 8 hours.</p> <p>NIOSH REL (United States, 4/2013). STEL: 27 mg/m³ 15 minutes. STEL: 35 ppm 15 minutes. TWA: 18 mg/m³ 10 hours. TWA: 25 ppm 10 hours.</p> <p>OSHA PEL (United States, 2/2013). TWA: 35 mg/m³ 8 hours. TWA: 50 ppm 8 hours.</p> <p>OSHA PEL 1989 (United States, 3/1989). STEL: 27 mg/m³ 15 minutes. STEL: 35 ppm 15 minutes.</p>

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Frostbite	: Try to warm up the frozen tissues and seek medical attention.
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	: As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product	: Non-flammable.
Auto-ignition temperature	: 651.11°C (1204°F)
Flammable limits	: Lower: 15% Upper: 28%
Products of combustion	: Decomposition products may include the following materials: nitrogen oxides
Fire hazards in the presence of various substances	: Extremely flammable in the presence of the following materials or conditions: oxidizing materials.
Fire-fighting media and instructions	: Use an extinguishing agent suitable for the surrounding fire. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk. Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
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.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Wash thoroughly after handling. High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Do not get in eyes, on skin or on clothing. Keep container closed. Do not get on skin or clothing. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- 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.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- 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.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

ammonia, anhydrous

ACGIH TLV (United States, 6/2013).

STEL: 24 mg/m³ 15 minutes.
STEL: 35 ppm 15 minutes.
TWA: 17 mg/m³ 8 hours.
TWA: 25 ppm 8 hours.

NIOSH REL (United States, 4/2013).

STEL: 27 mg/m³ 15 minutes.
STEL: 35 ppm 15 minutes.
TWA: 18 mg/m³ 10 hours.
TWA: 25 ppm 10 hours.

OSHA PEL (United States, 2/2013).

TWA: 35 mg/m³ 8 hours.
TWA: 50 ppm 8 hours.

Ammonia

OSHA PEL 1989 (United States, 3/1989).

STEL: 27 mg/m³ 15 minutes.

STEL: 35 ppm 15 minutes.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight	: 17.03 g/mole
Molecular formula	: H ₃ -N
Boiling/condensation point	: -33°C (-27.4°F)
Melting/freezing point	: -77.7°C (-107.9°F)
Critical temperature	: 132.85°C (271.1°F)
Vapor density	: 0.59 (Air = 1)
Specific Volume (ft³/lb)	: 22.7273
Gas Density (lb/ft³)	: 0.044
Physical/chemical properties comments	: SPECIFIC GRAVITY (AIR=1): @ 70°F (21.1°C) = 0.59 PH: Approx. 11.6 for 1 N Sol'n. in water

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
ammonia, anhydrous	TDL _o Oral	Rat	0.095 g/kg	-
	LC ₅₀ Inhalation Vapor	Rat	18600 mg/m ³	5 minutes
	LC ₅₀ Inhalation Vapor	Rat	7040 mg/m ³	30 minutes
	LC ₅₀ Inhalation Gas.	Rat	17401 ppm	15 minutes
	LC ₅₀ Inhalation Gas.	Rat	9500 ppm	1 hours
	LC ₅₀ Inhalation Gas.	Rat	7338 ppm	1 hours
	LC ₅₀ Inhalation Gas.	Rat	7338 ppm	1 hours
	LC ₅₀ Inhalation Gas.	Rat	7338 ppm	1 hours

IDLH : 300 ppm

Chronic effects on humans : May cause damage to the following organs: lungs, upper respiratory tract, skin, eyes.

Other toxic effects on humans : Hazardous by the following route of exposure: of skin contact (corrosive), of eye contact (corrosive), of inhalation (lung corrosive).

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
ammonia, anhydrous	-	Acute EC50 29.2 mg/l Marine water	Algae - Sea Lettuce - Ulva fasciata - Zoea	96 hours
	US EPA	Acute EC50 131 ppm Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
	-	Acute LC50 0.53 ppm Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 25400 µg/l Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 5210 to 6040 µg/l Marine water	Crustaceans - Redtail prawn - Fenneropenaeus penicillatus - Zoea	48 hours
	-	Acute LC50 4980 to 9070 µg/l Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Nauplii - 3 to 5 stage	48 hours
	-	Acute LC50 4180 to 6030 µg/l Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
	-	Acute LC50 4130 to 5100 µg/l Fresh water	Daphnia - Water flea - Daphnia pulex - <24 hours	48 hours
	-	Acute LC50 2710 to 3670 µg/l Fresh water	Crustaceans - Water flea - Ceriodaphnia reticulata - <4 hours	48 hours
	-	Acute LC50 2500 µg/l Fresh water	Crustaceans - Aquatic sowbug - Asellus aquaticus - 8 to 10 mm	48 hours
	-	Acute LC50 2080 µg/l Fresh water	Crustaceans - Scud - Gammarus pulex - 8 to 12 mm	48 hours
	-	Acute LC50 660 µg/l Fresh water	Fish - common carp - Cyprinus carpio	96 hours
	-	Acute LC50 450 to 470 µg/l Fresh water	Fish - Chinook salmon - Oncorhynchus tshawytscha - Underyearling - 1 to 7 g	96 hours
	-	Acute LC50 440 µg/l Fresh water	Fish - common carp - Cyprinus carpio	96 hours
	-	Acute LC50 380 µg/l	Fish - Silver carp	96 hours

Ammonia


	Fresh water	-	Hypophthalmichthys molitrix - Fingerling	
-	Acute LC50 300 µg/l Fresh water		Fish - Carp - Hypophthalmichthys nobilis	96 hours
-	Chronic NOEC 1 mg/l Fresh water		Algae - Diatom - Skeletonema costatum	3 days
-	Chronic NOEC 0.204 mg/l Marine water		Fish - Sea bass - Dicentrarchus labrax - 131.3 g	62 days
-	Chronic NOEC 550 µg/l Fresh water		Fish - Roach - Rutilus rutilus - Embryo	31 days / 6 hours




- Products of degradation** : Products of degradation: nitrogen oxides (NO, NO₂ etc.).
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1005	AMMONIA, ANHYDROUS	2.2	Not applicable (gas).		<p>Reportable quantity 100 lbs. (45.4 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p> <p>Cargo aircraft Quantity limitation: Forbidden.</p> <p>Special provisions 13, T50</p>

Ammonia						
TDG Classification	UN1005	AMMONIA, ANHYDROUS; OR ANHYDROUS AMMONIA	2.3	Not applicable (gas).	 	Explosive Limit and Limited Quantity Index 0 ERAP Index 3000 Passenger Carrying Ship Index Forbidden Passenger Carrying Road or Rail Index Forbidden Special provisions
Mexico Classification	UN1005	AMMONIA, ANHYDROUS	2.2	Not applicable (gas).		-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

- U.S. Federal regulations** : TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): This material is listed or exempted.
SARA 302/304: ammonia, anhydrous
SARA 311/312 Hazards identification: Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 311: ammonia, anhydrous
Clean Air Act (CAA) 112 accidental release prevention - Toxic Substances:
 Ammonia
Clean Air Act (CAA) 112 regulated toxic substances: ammonia, anhydrous

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Ammonia	7664-41-7	100
Supplier notification	: Ammonia	7664-41-7	100

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

State regulations

- : **Connecticut Carcinogen Reporting**: This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.

Ammonia

Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is listed.
New York Acutely Hazardous Substances: This material is listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

Canada

WHMIS (Canada)

: Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class E: Corrosive material

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

United States

Label requirements

: CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

Canada

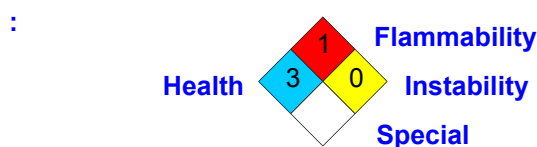
Label requirements

: Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class E: Corrosive material

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

Health	*	3
Flammability		1
Physical hazards		2

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



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET**Calcium Chloride 83%****Section 01 - Chemical And Product And Company Information**

Product Identifier Calcium Chloride 83%

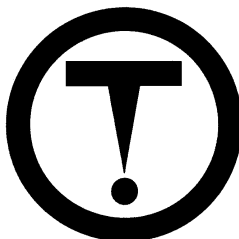
Product Use Industrial uses, drilling mud additives, workover fluids, completion fluids, ice melt, dust control, refrigeration.

Supplier Name..... ClearTech Industries Inc.
2302 Hanselman Avenue
Saskatoon, SK. Canada
S7L 5Z3

Prepared By..... ClearTech Industries Inc. Technical Department
Phone: (306)664-2522

Preparation Date..... April 28, 2010

24-Hour Emergency Phone..... 306-664-2522

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients	Calcium Chloride	83-87%
	Sodium Chloride	1-2%
	Potassium Chloride	2-3%
	Water	8-14%

CAS Number	Calcium Chloride	10043-52-4
	Sodium Chloride	7647-14-5
	Potassium Chloride	7447-40-7
	Water	7732-18-5

Synonym (s).....Calcium chloride flake



Section 03 - Hazard Identification

- Inhalation**..... Dust or mist inhalation may irritate nose, throat, and lungs.
- Skin Contact / Absorption**..... May cause skin irritation. Under conditions of prolonged contact or when moisture is present, superficial burns may result. Contact with abraded skin or cuts can cause severe necrosis.
- Eye Contact**..... May irritate or burn eyes causing corneal injury which may heal slowly.
- Ingestion**..... May irritate gastrointestinal tract or cause ulcerations.
- Exposure Limits**..... ACGIH/TWA: 10mg/m³ (inhalable)
ACGIH/TWA: 3mg/m³ (respirable)

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 medical attention if breathing difficulties persists.
- 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**..... Give large amounts of water. Do not give anything by mouth to an unconscious or convulsing person. Immediately phone your local poison control center. Vomiting may need to be induced under the direction of medical personnel.
- Additional Information**..... If burn is present, treat as any thermal burn, after decontamination. Treatment based on judgment of the physician in response to reactions of the patient.

Section 05 - Fire Fighting

- Conditions of Flammability**..... Non-flammable
- Means of Extinction**..... Product does not burn. 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... Not available

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Explosion Hazards..... Not available

Section 06 - Accidental Release Measures

Leak / Spill..... Wear appropriate personal protective equipment if required. Prevent material from entering sewers, soils, waterways and groundwater. Sweep up spilled material and place in container for disposal. Flush with water to remove any residue.

Deactivating Materials..... Not available

Section 07 - Handling and Storage

Handling Procedures..... Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure. Use cool water < 27°C when diluting or dissolving product.

Storage Requirements..... Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials. Prolonged storage may cause product to cake and become wet. Protect product from moisture.

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**..... NIOSH/MSHA approved respirator for dust should be worn if the potential to exceed exposure limit requirements or if workplace regulations mandate protection is needed.
- Gloves**..... Impervious gloves of chemically resistant material (rubber, neoprene 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. Wash contaminated clothing with and dry thoroughly before reuse.
- Footwear**..... No special footwear is required other than what is mandated at place of work.

Engineering Controls

- Ventilation Requirements**..... Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided to control airborne levels. Supply sufficient replacement air to make up for air removed by exhaust systems.
- Other**..... Emergency shower and eyewash should be in close proximity.

Section 09 - Physical and Chemical Properties

- Physical State**..... Solid
- Odor and Appearance**..... White odourless flakes
- Odor Threshold**..... Not applicable
- Specific Gravity (Water=1)**..... 2.16
- Vapor Pressure (mm Hg, 20C)**..... Not available
- Vapor Density (Air=1)**..... Not available
- Evaporation Rate**..... Not available
- Boiling Point**..... Not applicable to solid material
- Freeze/Melting Point**..... 260°C
- pH**..... >7 for an aqueous solution



Water/Oil Distribution Coefficient.... Not available
Bulk Density..... 45-54 lb/ft³
% Volatiles by Volume..... Not available
Solubility in Water..... Very soluble
Molecular Formula..... CaCl₂
Molecular Weight..... 110.98

Section 10 - Stability and Reactivity

Stability..... Product is very stable, hygroscopic.
Incompatibility..... Incompatible with sulphuric acid, water-reactive materials such as sodium, methyl vinyl ether, and zinc as in galvanized iron.
Hazardous Products of Decomposition.. Yields hydrogen chloride gas in contact with sulphuric acid. Mixing with water and water-reactive materials causes an exothermic reaction. With zinc, yields flammable hydrogen gas. Reaction of bromide impurity with an oxidizer may generate trace levels of impurities such as bromate.
Polymerization..... Will not occur.

Section 11 - Toxicological Information

Irritancy..... Mild irritant
Sensitization..... Not available
Chronic/Acute Effects..... Chronic exposure to calcium chloride may cause irritation or burns to skin, eyes and nasal cavity.
Synergistic Materials..... Not available
Animal Toxicity Data..... LD₅₀(oral, rat): 918-1668mg/kg
LD₅₀(dermal, rabbit): > 5000mg/kg
Carcinogenicity..... Not considered to be carcinogenic by NTP, IARC, OSHA.
Reproductive Toxicity..... Did not cause any birth or fetal effects on laboratory animals.



Teratogenicity..... Not available

Mutagenicity..... Not available

Section 12 - Ecological Information

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

Biodegradability..... Not available

Environmental Effects..... Not expected to bioconcentrate because of its high solubility.

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

TDG Classification

Class..... Not regulated

Group..... Not regulated

PIN Number..... Not regulated

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment.

Section 15 - Regulatory Information

WHMIS Classification.....D2

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.

Section 16 - Other Information

Note: The responsibility 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, and assume no liability for damages incurred by the use of this material. It is the responsibility 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 its 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 Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 th Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

24 Hour Emergency Number - All Locations - 306-664-2522

MATERIAL SAFETY DATA SHEET



CAUSTIC SODA

Drilling Fluids

1. Product and Company Identification

Material name CAUSTIC SODA
Chemical name Sodium hydroxide
Applications Alkalinity Control
Supplier Baker Hughes Drilling Fluids
2001 Rankin Rd.
Houston, TX 77073
Emergency telephone number 713-439-8900

2. Composition / Information on Ingredients

Components	CAS #	Percent
SODIUM HYDROXIDE	1310-73-2	> 97
Non-hazardous and other components below reportable levels		1 - 2.5
Composition comments	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	

3. Hazards Identification

Emergency overview May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system. Risk of serious damage to eyes.

Potential health effects

Routes of exposure Inhalation. Skin contact. Eye contact.

Eyes Causes severe eye burns. Corrosive to the eyes and may cause severe damage including blindness.

Skin Contact causes severe skin irritation and possible burns.

Inhalation Can cause severe respiratory irritation. Inhalation of mists or vapors may produce upper airway edema, wheezing, pulmonary edema, pneumonitis and respiratory failure.

Ingestion Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion of this product may cause nausea, vomiting and diarrhea.

Target organs Eyes. Respiratory system. Skin.

Chronic effects Prolonged skin contact may defat the skin and produce dermatitis.

4. First Aid Measures

First aid procedures

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.

Skin contact Wash off immediately with plenty of water for at least 15 minutes. Wash affected area with mild soap and water. Remove and isolate contaminated clothing and shoes. Get medical attention immediately. Launder contaminated clothing before reuse.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion Immediately give large quantities of water to drink. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Get medical attention immediately.

General advice Keep victim warm. In case of shortness of breath, give oxygen. Immediate medical attention is required. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties None known.

Extinguishing media

Suitable extinguishing media Do not use water. Use extinguishing agent suitable for type of surrounding fire.

Protection of firefighters

Protective equipment for firefighters

Move containers from fire area if you can do it without risk. Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

6. Accidental Release Measures

Evacuation procedures

Ventilate closed spaces before entering. Keep unnecessary personnel away. Local authorities should be advised if significant spillages cannot be contained.

Methods for containment

Prevent entry into waterways, sewers, basements or confined areas. Stop the flow of material, if this is without risk.

Methods for cleaning up

Shovel or sweep up. Avoid dust formation.

7. Handling and Storage

Handling

Handle and open container with care. Avoid breathing dusts from this material. Do not get this material in your eyes, on your skin, or on your clothing. Wash hands after handling and before eating. Considerable heat is generated when water or acid is added, therefore when making solutions always add the caustic to the water or acid with constant stirring.

Storage

Use care in handling/storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep this material away from food, drink and animal feed. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Exposure guidelines

ACGIH - Threshold Limits Values - Ceilings (TLV-C)

SODIUM HYDROXIDE 1310-73-2 2 Mg/m3 Ceiling

ACGIH - Threshold Limits Values - TLV Basis - Critical Effects

SODIUM HYDROXIDE 1310-73-2 irritation

OSHA - Final PELs - Time Weighted Averages (TWAs)

SODIUM HYDROXIDE 1310-73-2 2 Mg/m3 TWA

Engineering controls

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Personal protective equipment

Eye / face protection

Wear chemical goggles. Face-shield. Eye wash fountain and emergency showers are recommended.

Skin protection

Use of protective coveralls and long sleeves is recommended. Use of impervious boots is recommended. Use of an impervious apron is recommended. Recommended gloves include rubber, neoprene, nitrile or viton.

Respiratory protection

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygiene considerations

Avoid contact with the skin and the eyes. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance / Color / Form

Pellets. White. Solid.

Odor

Odourless.

Clarity

Not available

Odor threshold

Not available

Physical state

Solid

pH

12, conc: 0.05% (solution); 13, conc: 1% (solution); 14, conc: 5% (solution)

Melting point

604.4 °F (318 °C) estimated

Freezing point

Not available

Boiling point

2534 °F (1390 °C) estimated

Flash point

Not available

Evaporation rate

Not available

Flammability limits in air, lower, % by volume

Not available

Flammability limits in air, upper, % by volume

Not available

Vapor pressure

0 HPa at 20 °C

Vapor density

Not available

Specific gravity	2.13 @20 C
Relative density	2.1322 estimated
Solubility	Soluble in water.
Octanol/H2O coeff	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available
Molecular weight	40.01 g/mol
Molecular formula	NaOH

10. Chemical Stability and Reativity Information

Chemical stability	Stable at normal conditions.
Conditions to avoid	Avoid contact with water. Direct contact with water may cause an exothermic reaction.
Incompatible materials	Alkali sensitive metals or alloys including aluminum, brass, bronze, copper, lead, tin, and zinc. Acids. Halogenated compounds.
Hazardous decomposition products	None known.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Acute effects	Causes severe burns.
Component analysis - LD50	
Toxicology Data - Selected LD50s and LC50s	
SODIUM HYDROXIDE	1310-73-2 Dermal LD50 Rabbit: 1350 mg/kg
Chronic effects	Prolonged or repeated exposure may cause lung injury. Prolonged skin contact may defat the skin and produce dermatitis.

12. Ecological Information

Ecotoxicity	Because of the high pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Environmental effects	Harmful to aquatic life.
Persistence / degradability	This material is inorganic and not subject to biodegradation.
Bioaccumulation / accumulation	Not expected to bioaccumulate.

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations.
-----------------------	--

14. Transport Information

Department of Transportation (DOT) Requirements

Basic shipping requirements:

Proper shipping name	Sodium hydroxide, solid
Hazard class	8
UN number	UN1823
Packaging group	II

Additional information:

Special provisions	IB8, IP2, IP4
Packaging exceptions	154
Packaging non bulk	212
Packaging bulk	240
ERG number	154



IATA**Basic shipping requirements:**

Proper shipping name Sodium hydroxide, solid
Hazard class 8
UN number 1823
Packaging group II

**IMDG****Basic shipping requirements:**

Proper shipping name SODIUM HYDROXIDE, SOLID
Hazard class 8
UN number 1823
Packaging group II
Additional information:
Hazard ID 80
Item C6
Labels required 8
Transport Category 2

**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.

FDA - Direct Food Additives

SODIUM HYDROXIDE 1310-73-2 21 CFR 173.310

FDA - Food Additives Generally Recognized as Safe (GRAS)

SODIUM HYDROXIDE 1310-73-2 21 CFR 184.1763

Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical Yes

CERCLA (Superfund) reportable quantity SODIUM HYDROXIDE: 1000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
 Delayed Hazard - No
 Fire Hazard - No
 Pressure Hazard - No
 Reactivity Hazard - Yes

Section 302 extremely hazardous substance No

Section 311 hazardous chemical Yes

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 (CCS)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Japanese Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Korean Inventory of Chemicals (KICS)	Yes
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)

International regulations

The product is classified and labelled in accordance with EC directives or respective national laws.

State regulations**Massachusetts - Right To Know List**

SODIUM HYDROXIDE 1310-73-2 Present

New Jersey - Right to Know Hazardous Substance List

SODIUM HYDROXIDE 1310-73-2 sn 1706

Pennsylvania - RTK (Right to Know) List

SODIUM HYDROXIDE 1310-73-2 Environmental hazard

16. Other Information**HMIS ratings**

Health: 3*
Flammability: 0
Physical hazard: 2
Personal protection: D

NFPA ratings

Health: 3
Flammability: 0
Instability: 2

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.

EU preparer

Melanie Thatcher (Tel +44 (0)1224 721597)

US preparer

Cheryl Hood - (713)625-4888

Issue date

03-27-2006



Material Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Supreme Motor Oil

Product Use: Automotive Motor Oil

Product Number(s): CPS220002, CPS220011, CPS220059, CPS220060

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

Company Identification

Chevron Products Company
Global Lubricants
6001 Bollinger Canyon Rd.
San Ramon, CA 94583
United States of America
www.chevron-lubricants.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@chevrontexaco.com
Product Information: (800) LUBE TEK
MSDS Requests: (800) 414-6737

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Highly refined mineral oil (C15 - C50)	Mixture	75 - 95 %weight

SECTION 3 HAZARDS IDENTIFICATION

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.

SECTION 4 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.

SECTION 5 FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

OSHA Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

FLAMMABLE PROPERTIES:

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

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. 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 and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Keep out of the reach of children.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

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. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

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 3), 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	Agency	TWA	STEL	Ceiling	Notation
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--
Highly refined mineral oil (C15 - C50)	OSHA Z-1	5 mg/m3	--	--	--

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
pH: Not Applicable
Vapor Pressure: <0.01 mmHg @ 100 °C (212 °F)
Vapor Density (Air = 1): >1
Boiling Point: >315°C (599°F)
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable
Specific Gravity: 0.885 @ 15.6°C (60.1°F) / 15.6°C (60.1°F) (Typical)
Viscosity: 9.9 cSt @ 100°C (212°F) (Min)

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Incompatibility With Other Materials: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: None known (None expected)

Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS

Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.

Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.

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

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

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

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

ADDITIONAL TOXICOLOGY INFORMATION:

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).

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.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is not expected to be harmful to aquatic organisms.

ENVIRONMENTAL FATE

This material is not expected to be readily biodegradable.

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.

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.

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

Additional Information: NOT HAZARDOUS BY U.S. DOT. ADR/RID HAZARD CLASS NOT APPLICABLE.

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

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:	1. Immediate (Acute) Health Effects:	NO
	2. Delayed (Chronic) Health Effects:	NO
	3. Fire Hazard:	NO
	4. Sudden Release of Pressure Hazard:	NO
	5. Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

- | | |
|---------------------|----------------------|
| 01-1=IARC Group 1 | 03=EPCRA 313 |
| 01-2A=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: EINECS (European Union), ENCS (Japan), KECI (Korea), PICCS (Philippines), TSCA (United States).

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

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

NEW JERSEY RTK CLASSIFICATION:

Under the New Jersey Right-to-Know Act L. 1983 Chapter 315 N.J.S.A. 34:5A-1 et. seq., the product is to be identified as follows: PETROLEUM OIL (Motor oil)

WHMIS CLASSIFICATION:

This product is not considered a controlled product according to the criteria of the Canadian Controlled Products Regulations.

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 1 Reactivity: 0

HMIS RATINGS: Health: 1 Flammability: 1 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

LABEL RECOMMENDATION:

Label Category : ENGINE OIL 1 - ENG1

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 2,15

Revision Date: October 04, 2006

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
	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Government Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	MSDS - Material Safety Data Sheet
CVX - Chevron	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

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Chevron Energy Technology Company, 100 Chevron Way, Richmond, California 94802.

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.

Praxair™ Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Chlorine (MSDS No. P-4580-E)	Trade Name: Chlorine
Chemical Name: Chlorine	Synonyms: Not applicable
Formula: Cl ₂	Chemical Family: Halogen
Telephone:	Company Name: Praxair, Inc.
Emergencies: 1-800-645-4633*	39 Old Ridgebury Road
CHEMTREC: 1-800-424-9300*	Danbury CT 06810-5113
Routine: 1-800-PRAXAIR	

*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition / Information on Ingredients

For custom mixtures of this product request a Material Safety Data Sheet for each component. See Section 16 for important information about mixtures.

INGREDIENT NAME	CAS NUMBER	PERCENTAGE	OSHA PEL	ACGIH TLV
Chlorine	7782-50-5	>99*	1 ppm (ceiling)**	0.5 ppm

* The symbol ">" means "greater than."

**Ceiling values are not Time-Weighted Average (TWA)

3. Hazards Identification



EMERGENCY OVERVIEW



**DANGER! Toxic, corrosive, oxidizing liquid and gas under pressure.
Harmful or fatal if inhaled.**

Causes eye, skin, and respiratory tract burns.

Can support combustion.

**Self-contained breathing apparatus must
be worn by rescue workers.**

Odor: Pungent, irritating, choking

THRESHOLD LIMIT VALUE: 0.5 ppm TLV-TWA; 15 min, 1 ppm STEL ACGIH (1997).

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION – Overexposure to concentrations moderately above the Threshold Limit Value (TLV) of 1 ppm irritates the eyes and respiratory tract. Very brief exposure to a concentration of 1000 ppm may be fatal. Acts as asphyxiant at high concentrations. Inhalation of high concentrations (e.g., greater than 15 ppm) causes choking, coughing, burning of the throat and severe irritation of the upper respiratory tract; additionally, pulmonary edema, bronchitis, and pneumonitis may result. Lack of oxygen can kill.

SKIN CONTACT – May severely irritate the skin, causing ulceration, chemical burns, and scarring. Repeated exposure may produce dermatitis. With prolonged or widespread contact, the skin may absorb potentially harmful amounts of material.

SWALLOWING – An unlikely route of exposure; this product is a gas at normal temperature and pressure. May cause chemical burns of the mouth, esophagus, and stomach.

EYE CONTACT – May severely inflame the conjunctiva, injuring the lens, and causing corneal opacity and iris atrophy.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Repeated exposure may cause progressive lung dysfunction. Exposure may also corrode the teeth and may cause a chloracne-like condition.

OTHER EFFECTS OF OVEREXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease, as well as heart disease. Skin contact may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: Chlorine is not listed by NTP, OSHA, and IARC.

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. Qualified personnel may give oxygen when necessary. Keep patient warm. Call a physician.

SKIN CONTACT: Avoid breathing vapor. Immediately flush affected areas with plenty of warm water while removing contaminated clothing and shoes. Discard clothing and shoes. Call a physician.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

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

NOTES TO PHYSICIAN: *Victims of overexposure should be kept under medical observation for 24 to 48 hours or 72 hours if exposure was severe. The hazards of this material are due mainly to its severe irritant and corrosive properties on the skin and mucosal surfaces. Injury occurs mainly to the skin and to mucosal surfaces. There is no specific antidote; and treatment should be directed at the control of symptoms and clinical condition. Delayed pulmonary edema may occur.*

5. Fire Fighting Measures

FLASH POINT (test method)	Not applicable	AUTOIGNITION TEMPERATURE	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	Not applicable	UPPER Not applicable

EXTINGUISHING MEDIA: Oxidizing agent; may accelerate combustion. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

DANGER! Toxic, corrosive, oxidizing liquid and gas under pressure. Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool cylinders with water spray from maximum distance, then move them away from fire if without risk. If cylinders are leaking, reduce toxic vapors with water spray or fog. Do not spray water directly on leak; this may cause leak to increase. Reverse flow into cylinders may cause rupture. Shut off leak if without risk. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxidizing agent, may accelerate combustion. Contact with flammable materials may cause fire or explosion. Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Chlorine cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.) Chlorine may react violently with other materials at temperatures above 483°F (250.5°F). (See "Incompatibility," section 10.) Vapors are extremely irritating and may burn skin and eyes on contact.

HAZARDOUS COMBUSTION PRODUCTS: None known.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Toxic, corrosive, oxidizing liquid and gas under pressure. Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Oxidizing agent; contact with flammable materials may cause fire or explosion. Do not spray water directly on source of flow or leak; this may accelerate flow. Reduce vapors with fog or fine water spray. Reverse flow into cylinder may cause rupture. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Prevent runoff from contaminating surrounding environment. Toxic, corrosive vapors may spread from spill. Before entering area, especially a confined area, check atmosphere with an appropriate device.

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

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation, away from oil, grease, and other combustibles. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not

exceed 125°F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

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

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

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST – A corrosion-resistant system is acceptable.

MECHANICAL (general) – Inadequate. See SPECIAL, below..

SPECIAL – Use only in a closed system. Corrosion-resistant, forced-draft fume hood is preferred

OTHER - See special.

RESPIRATORY PROTECTION: Select per OSHA 29 CFR 1910.134 and ANSI Z88.2. Use air-supplied respirators for concentrations up to 10 times the applicable permissible exposure limit. For concentrations up to 50 times the applicable exposure limit, use a NIOSH/MSHA-approved respirator with a full face piece or use a self-contained breathing apparatus. For higher concentrations, use only a full-face, self-contained breathing apparatus operated in the pressure demand mode.

PROTECTIVE GLOVES: Neoprene.

EYE PROTECTION: Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling and protective clothing where needed. Select per OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT: 70.906	EXPANSION RATIO: Not applicable
SPECIFIC GRAVITY (Air=1): 2.485 At 32°F (0°C)	SOLUBILITY IN WATER: Slight
GAS DENSITY: At 32°F (0°C) 0.20057 lb/ft ³ (3.2128 kg/m ³)	VAPOR PRESSURE: At 68°F (20°C): 85.3 psig (588.13 KPa)
PERCENT VOLATILES BY VOLUME: 100	EVAPORATION RATE (Butyl Acetate=1): High
BOILING POINT, 760 mm. Hg: -29.15°F (-33.97°C)	pH: Not applicable

MELTING POINT (1 atm): -149.76°F (-100.97°C)

APPEARANCE, ODOR, AND STATE: Greenish-yellow gas at normal temperature and pressure; pungent, irritating, choking odor.

10. Stability and Reactivity

STABILITY:	Unstable	Stable	X
-------------------	----------	--------	---

INCOMPATIBILITY (materials to avoid): Chlorine reacts violently with most materials including metals (e.g., aluminum, copper, brass), especially flammable materials and other reducing agents, including carbon steel, at temperatures above 483°F (250.5°F).

HAZARDOUS DECOMPOSITION PRODUCTS: Burning may produce toxic fumes of chlorides.

HAZARDOUS POLYMERIZATION:	May Occur	Will Not Occur	X
----------------------------------	-----------	----------------	---

CONDITIONS TO AVOID: None known.

11. Toxicological Information

LC₅₀ = 293 ppm (1 hr. rat)

12. Ecological Information

Chlorine does not contain any Class I or Class II ozone-depleting chemicals. Chlorine is not listed as a marine pollutant by DOT.

13. Disposal Considerations

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

14. Transport Information

DOT/IMO SHIPPING NAME: Chlorine	HAZARD CLASS: 2.3
IDENTIFICATION NUMBER: UN 1017	PRODUCT RQ: 10 lbs (4.54 kg)
SHIPPING LABEL(s): TOXIC GAS, CORROSIVE, OXIDIZER	PLACARD (When required): TOXIC GAS, CORROSIVE, OXIDIZER

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Additional Marking Requirement: Inhalation Hazard

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:**EPA (Environmental Protection Agency)**

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 10 lbs (4.54 kg)

SARA: Superfund Amendment and Reauthorization Act:

- **SECTIONS 302/304:** Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of extremely hazardous substances (40 CFR Part 355):

Threshold Planning Quantity (TPQ): 100 lbs (45.4 kg)

Extremely Hazardous Substances (40 CFR 355): None

- **SECTIONS 311/312:** Require submission of Material Safety Data Sheets (MSDSs) and chemical inventory reporting with identification of EPA hazard categories. The hazard categories for this products are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: Yes

REACTIVITY: No

FIRE: Yes

- **SECTION 313:** Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Chlorine requires reporting under Section 313.

40 CFR 68: Risk Management Program for Chemical Accidental Release Prevention: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Chlorine is listed as a regulated substance in quantities of 2500 lbs (1134 kg) or greater.

TSCA: Toxic Substances Control Act: Chlorine is listed on the TSCA inventory.

OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION):

29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Chlorine is listed in Appendix A as a highly hazardous chemical in quantities of 1500 pounds (680 kg) or greater.

STATE REGULATIONS:

CALIFORNIA: This product is not listed by California under the Safe Drinking Water Toxic Enforcement Act of 1986 (Proposition 65).

PENNSYLVANIA: This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Toxic, corrosive, nonflammable liquid and gas under pressure.* Do not breathe gas. Do not get vapors or liquid in eyes, on skin, or on clothing. (See section 3.) Have safety showers and eyewash fountains immediately available. *Use piping and equipment adequately designed to withstand pressures to be encountered.* Use only in a closed system constructed of corrosion-resistant materials. Close valve after each use; keep closed even when empty. *Prevent reverse flow.* Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. *Store and use with adequate ventilation at all times.* *Oxidizing agent.* Store away from flammable materials. Keep oil, grease and flammable materials away. *Never work on a pressurized system.* If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe manner in compliance with all federal, state, and local laws, then repair the leak. *Never ground a compressed gas cylinder or allow it to become part of an electrical circuit.*

NOTE: *Prior to using any plastics, confirm their compatibility with chlorine.*

Recommended Equipment: In semiconductor process gas and other suitable applications, Praxair recommends the use of engineering controls such as gas cabinet enclosures, automatic gas panels (used to purge systems on cylinder changeout), excess-flow valves throughout the gas distribution system, double containment for the distribution system, and continuous gas monitors.

MIXTURES: When you mix two or more gases or liquefied gases, 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. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:**NFPA RATINGS:**

HEALTH = 4
 FLAMMABILITY = 0
 REACTIVITY = 0
 SPECIAL OX

HMIS RATINGS:

HEALTH = 2
 FLAMMABILITY = 0
 REACTIVITY = 0

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:**THREADED:** CGA-660 limited-standard for Specialty Gas Industry**PIN-INDEXED YOKE:** Not applicable**ULTRA-HIGH-INTEGRITY****CONNECTION:** CGA-728 standard, 634 limited-std (obsolete 1/1/98)

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional standard industrial yoke connections apply. See CGA Pamphlet V-1 listed below.

Ask your supplier about free Praxair safety literature as referenced on the label for this product; you may also obtain copies by calling 1-800-PRAXAIR. Further information about chlorine can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

- P-1 *Safe Handling of Compressed Gases in Containers*
- V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*
Handbook of Compressed Gases, Third Edition

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

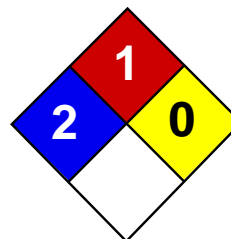
The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair,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

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14150-7891).

Praxair is a trademark of Praxair Technology, Inc.

Praxair, Inc.
39 Old Ridgebury Road
Danbury CT 06810-5113





Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Citric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Citric acid

Catalog Codes: SLC5449, SLC2665, SLC4453, SLC1660, SLC3451

CAS#: 77-92-9

RTECS: GE7350000

TSCA: TSCA 8(b) inventory: Citric acid

CI#: Not available.

Synonym: 2-Hydroxy-1,2,3-propanetricarboxylic acid

Chemical Name: Citric Acid

Chemical Formula: C₆H₈O₇

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
Citric acid	77-92-9	100

Toxicological Data on Ingredients: Citric acid: ORAL (LD50): Acute: 5040 mg/kg [Mouse]. 3000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion. 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. Severe over-exposure can produce lung damage, choking, unconsciousness or death.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). **CARCINOGENIC EFFECTS:** Not available. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to teeth. 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.

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 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. 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: 1010°C (1850°F)

Flash Points: Not available.

Flammable Limits: LOWER: 0.28 Kg/M3 (Dust) UPPER: 2.29 Kg/M3 (Dust)

Products of Combustion: These products are carbon oxides (CO, CO₂).

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 presences 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. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

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. 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. Avoid contact with eyes. 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. Keep away from incompatibles such as oxidizing agents, reducing agents, 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:

Safety glasses. Lab coat. Gloves (impervious). Dust respirator. Be sure to use an approved/certified respirator or equivalent. The dust respirator should be used for conditions where exposure has exceeded recommended exposure limits, dust is apparent, and engineering controls (adequate ventilation) are not feasible.

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:

No exposure guidelines have been established. ACGIH, NIOSH and OSHA have not developed exposure limits for this product. The exposure limits given below are for particulates not otherwise classified: ACGIH: 10 mg/m³ TWA (Total Inhalable fraction); 3 mg/m³ TWA (Respirable fraction) OSHA: 15 mg/m³ TWA (Total dust); 5 mg/m³ TWA (Respirable Fraction)

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline powder)

Odor: Odorless.

Taste: Acid. (Strong.)

Molecular Weight: 192.13 g/mole

Color: Not available.

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

Boiling Point: Decomposes.

Melting Point: 153°C (307.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.665 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -1.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:

Soluble in cold water, hot water, diethyl ether. Insoluble in benzene.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, metals, alkalis.

Corrosivity:

Corrosive in presence of aluminum, of zinc, of copper. Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with oxidizing agents, potassium tartrate, alkali, alkaline earth carbonates and bicarbonates, acetates, and sulfides, metal nitrates

Special Remarks on Corrosivity: Will corrode copper, zinc, aluminum and their alloys.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 3000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: teeth.

Other Toxic Effects on Humans:

Hazardous in case of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion.

Special Remarks on Toxicity to Animals: LDL[Rabbit] - Route: oral; Dose: 7000mg/kg

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. Eyes: Causes moderate to severe eye irritation and possible injury. Ingestion: May cause gastrointestinal (digestive) tract irritation with nausea, vomiting, diarrhea. Excessive intake may cause erosion of teeth and hypocalcemia (calcium deficiency in blood). May affect behavior/central nervous system (tremor, convulsions, muscle contraction or spasticity). Inhalation: Causes moderate respiratory tract and mucous membrane irritation. Chronic Potential Health Effects: Frequent intake of citrated beverages may cause erosion of dental enamel and irritation of mucous membranes.

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: 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: TSCA 8(b) inventory: Citric acid

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):

R36/37/38- Irritating to eyes, respiratory system and skin. 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.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: e

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

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves (impervious). Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:56 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Initial Preparation Date: 3/30/09
Last Revision Date: 4/2/09
Effective Date: 12/11/09

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTITY: BlueDEF™ DIESEL EXHAUST FLUID

1. CHEMICAL PRODUCT & COMPANY INFORMATION

*OLD WORLD INDUSTRIES, INC.
4065 COMMERCIAL AVENUE
NORTHBROOK, ILLINOIS 60062
PHONE: 847-559-2000
EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC)*

2. COMPOSITION / INFORMATION ON INGREDIENTS

No hazardous components identified per 29 CFR 1910.1200.

<u>Material</u>	<u>CAS#</u>	<u>% by Wt.</u>	<u>STEL</u>	<u>TLV (ACGIH)</u>	<u>TWA</u>
Urea	57-13-6	32 – 33	Not established	10 mg/m ³ (AIHA WEEL)	

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.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Lowest Known LD50 (Oral):	Not known
Lowest Known LD50 (Skin):	Not known
Carcinogeny:	Not identified as a carcinogen
National Toxicology Program:	Not identified as a carcinogen
International Agency for Research on Cancer:	Not identified as a carcinogen
OSHA:	Not identified as a carcinogen

HAZARD RATING SYSTEM

NPFA: HEALTH: 1	FLAMMABILITY: 0	REACTIVITY: 0			
HMIS: HEALTH: 1	FLAMMABILITY: 0	REACTIVITY: 0	PERSONAL PROTECTION:		
KEY:	0 - Minimal	1 - Slight	2 - Moderate	3 - Serious	4 - Severe

POTENTIAL HEALTH EFFECTS

Eye: Contact may cause mild eye irritation, including stinging, watering and redness.

Skin: Contact may cause mild skin irritation, including redness and burning. No harmful effects from skin absorption have been reported.

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): No harmful effects reported from ingestion.

Cancer: Inadequate evidence available to evaluate the cancer hazard of this material.

Target Organs: No data available.

Developmental: Inadequate evidence available for this material.

Pre-Existing Medical Conditions: None known.

4. FIRST AID MEASURES

Ensure physician has access to this MSDS.

Routes of Entry: Inhalation, Skin, Ingestion

Signs and Symptoms of Exposure: Effects of overexposure may include irritation of the nose, throat and digestive tract, headaches, coughing, nausea, vomiting and transient disorientation.

TREATMENT

Eyes: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops and persists, seek medical attention.

Inhalation: If respiratory difficulties develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion: Do NOT induce vomiting. First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Notes to Physician: None.

5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION HAZARD DATA

Flammable Properties

Flash Point: None to boiling
Method Used:

Flammability Limits - % of vapor concentration at which product can ignite in presence of spark.

LEL: No data
UEL: No data

Hazardous Combustion Products: Closed containers exposed to extreme heat can rupture due to pressure building. Carbon oxides, nitrogen oxides, ammonia, biuret, cyanuric acid and other irritating fumes and smoke.

Extinguishing Media: Use extinguishing agent suitable for type of surrounding fire.

Fire Fighting Instructions: Isolate immediate hazard area and keep unauthorized personnel out. Stop spill / release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk.

Protective Equipment For Fire Fighters: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or

confined spaces, or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. (See Section 8.)

6. ACCIDENTAL RELEASE MEASURES

Protect People: Wear appropriate protective equipment, including respiratory protection, as conditions warrant. (See Section 8.)

Protect the Environment: To prevent spilled material from entering sewers, storm drains or natural watercourses, contain material with a dike or with appropriate absorbent materials such as sand, clay, soil or commercially available absorbent. Place reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to Section 13 for appropriate disposal.

Cleanup: Stop the source of the release if it can be done without risk. Immediately isolate the hazard area and restrict access to authorized personnel only.

7. HANDLING AND STORAGE

Handling: Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits. (See Sections 2 and 8.) Wash thoroughly after handling. Do not wear contaminated clothing or shoes. Use good personal hygiene practice.

Storage: Keep container(s) tightly closed. Do not heat or contact with strong oxidizers. Use and store this material in cool, dry, well-ventilated areas. Do not store at temperatures below 40° F. Store only in approved containers. Keep away from any incompatible material. (See Section 10.) Protect container(s) against physical damage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory Protection: Respiratory protection is not usually required. If significant spray or mist occurs, wear a NIOSH approved or equivalent dust respirator.

Skin Protection: The use of gloves impermeable to the specific material handled is advised to prevent skin contact, possible irritation and absorption. (See glove manufacturer for information on permeability.)

Eye Protection: Approved eye protection to safeguard against potential eye contact, irritation or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Engineering Controls: If current ventilation practices are not adequate to minimize exposure, additional ventilation or exhaust systems may be required.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:	>212° F
Crystallization Point:	12° F
Pounds/Gallon:	9.09
Specific Gravity (Water =1):	1.09
Vapor Pressure (mm of Hg):	Not applicable
Vapor Density (Air=1):	0.6 H2O, >1
Water Solubility:	100%
Appearance:	Colorless, clear liquid
Odor:	None to slight ammonia
Evaporation Rate:	<1

10. STABILITY & REACTIVITY DATA

Stability: Stable under normal conditions of storage and handling.

Conditions to Avoid: None known.

Incompatibility (Materials to Avoid): Avoid contact with strong oxidizing agents such as chlorine (bleach), peroxides, chromates, nitric acid, perchlorates, concentrated oxygen or permanganates. Contact can generate heat, fires, explosions and release toxic fumes.

Hazardous Decomposition Products: If involved in a fire, oxides of carbon and nitrogen may be generated; exposure to heat may generate ammonia fumes.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

No definitive information available on carcinogenicity, mutagenicity, target organs or developmental toxicity.

Toxicological data: There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

Ingredients	LC ₅₀ (4 hr) Inh, rat	LD ₅₀	
		Oral	Dermal
Urea	N/Av	8471 mg/kg (rat)	8200 mg/kg (rabbit)

12. ECOLOGICAL INFORMATION

No data available.

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, is not a RCRA “listed” or “characteristic” hazardous waste. Use resulting in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D. As a non-hazardous liquid waste, it should be solidified with stabilizing agents such as sand, fly ash, or clay absorbent, so that no free liquid remains before disposal to an industrial waste landfill.

RCRA # Not listed

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT): NOT CONTROLLED UNDER DOT.

Proper Shipping Name:	Labels Required:
Hazard Class:	Placard:
UN Identification:	Exemption:
Packing Group:	Reportable Quantity:

ICAO/IATA: NOT CONTROLLED UNDER ICAO/IATA.

Proper Shipping Name:	Labels Required:
Hazard Class:	Placard:
UN Identification:	Exemption:
Packing Group:	Reportable Quantity:

IMDG: NOT CONTROLLED UNER IMDG.

Proper Shipping Name:	Labels Required:
Hazard Class:	Placard:
UN Identification:	Exemption:
Packing Group:	Reportable Quantity:

15. REGULATORY INFORMATION

Sara Title III: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372: **None**

California Proposition 65: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): **None known**

EPA (CERCLA) Reportable Quantity: **None**

Canadian Regulations:

WHMIS Information: This product is not a WHMIS controlled product in Canada. Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program. All ingredients appear on the Domestic Substances List (DSL).

16. OTHER INFORMATION

Contact: Thomas Cholke

Phone: (847) 559-2225

Old World Industries, Inc. 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, Inc. 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, Inc. assume liability arising out of the use by others of this product referred to herein. The data in this MSDS 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: PRODUCT AND COMPANY IDENTIFICATION

Product Name: Diesel Max
 Seasonal Diesel - LS
 Seasonal Diesel - LS (Dyed or Clear)
 Seasonal Diesel - RS
 Seasonal Diesel - RS (Dyed or Clear)
 Light Diesel (Low Sulphur, LS, Regular Sulphur, RS, Dyed or Clear)
 Light Diesel LS P-50
 Regular Sulphur Diesel (Dyed or Clear)

Synonyms: CASRN 68334-30-5.

Product Use: Motor fuel. Heating fuel.

Manufacturer/Supplier: Husky Oil Marketing Company
 PO Box 6525 Station 'D'
 Calgary, Alberta
 T2P 3G7

Phone Number: 403-298-6111

Emergency Phone: 403-262-2111

Date of Preparation: March 19, 2012

Section 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER
 COMBUSTIBLE LIQUID AND VAPOR. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. IRRITATING TO EYES AND SKIN.

Colour: Clear to pale yellow.
Physical State: Liquid.
Odour: Petroleum.

WHMIS	Personal Protection Equipment	TDG (Ground)
		

Potential Health Effects: See Section 11 for more information.

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation. Ingestion.

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hydrogen sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations. Above 50 ppm H₂S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.



Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: May cause respiratory tract irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache, dizziness, confusion, loss of appetite and loss of consciousness. Hydrogen sulphide may cause symptoms such as digestive upset and loss of appetite, loss of sense of smell and pulmonary edema. At 500-1000 ppm Hydrogen sulphide may cause respiratory paralysis, collapse and death without rescue.

Chronic Effects: See Section 11 for more information.

Medical Conditions Aggravated By Exposure: Not available.

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Nervous system.

Potential Environmental Effects: See Section 12 for more information.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS No.	Wt. %
Fuels, diesel	68334-30-5	60 - 100
Distillates (petroleum), hydrotreated middle	64742-46-7	60 - 100
Distillates (petroleum), hydrotreated light	64742-47-8	30 - 60
Additives *	(Various)	< 0.1

* May contain additives such as alkyl nitrate, polyisobutenyl succinic anhydride nitrogen functionalized dispersant, and mixed cyclic amines.

Section 4: FIRST AID MEASURES

Eye Contact: Flush eyes with plenty of water for at least 15 minutes. If signs/symptoms persist, get medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If signs/symptoms develop, 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 immediately.

Inhalation: Remove person to fresh air. If breathing has stopped apply artificial respiration. If signs/symptoms develop, get medical attention.

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show the label or MSDS where possible).

Note to Physicians: Symptoms may not appear immediately. For inhalation of Hydrogen Sulphide, consider oxygen.

Section 5: FIRE FIGHTING MEASURES

Flammability: Combustible liquid by WHMIS criteria. Combustible liquid by OSHA criteria. Released vapours may form flammable/explosive mixtures at or above the flash point. Vapours may travel considerable distances to ignition sources and cause a flash fire. Cool



containing vessels with water jet in order to prevent pressure build-up, auto-ignition or explosion.

Means of Extinction

Suitable Extinguishing Media: Dry chemical, foam, or carbon dioxide.

Unsuitable Extinguishing Media: Water may not be an effective medium to extinguish fire.

Products of Combustion: Oxides of carbon. Oxides of sulphur. Oxides of nitrogen.

Protection of Firefighters: Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). Hydrogen sulphide is heavier than air and may collect in low lying areas and confined spaces.

Explosion Data

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.

Sensitivity to Static Discharge: This material is sensitive to static discharge at temperatures above the flash point.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Evacuate all unnecessary personnel. Stay upwind. Eliminate all ignition sources. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Don full-face, positive pressure, self-contained breathing apparatus.

Environmental Precautions: Keep out of drains, sewers, ditches, and waterways.

Methods for Containment: Stop leak if without risk. Contain spill and absorb with inert absorbent. Large pools may be covered with foam to prevent vapour evolution. Do not flush to sewer or allow to enter waterways.

Methods for Clean-Up: Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large spills should be removed with explosion proof vacuum equipment.

Other Information: Dispose of in accordance with all federal, provincial and local regulations. Comply with federal, provincial, and local requirements for spill and/or release notification.

Section 7: HANDLING AND STORAGE

Handling:

Do not swallow. Do not get in eyes, or on skin. All equipment used when handling the product must be grounded. Handle and open container with care. When using do not eat or drink. Wash hands before eating, drinking, or smoking. See Section 8 for information on Personal Protective Equipment.

Storage:

Store in cool, dry, well-ventilated area away from incompatible materials, heat, and sources of ignition. All storage containers and pumping equipment should be grounded. Keep out of the reach of children. Head spaces in storage containers may contain toxic hydrogen sulphide gas. Structural materials and lighting and ventilation systems should be corrosion resistant.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

**Exposure Guidelines
Component**



Fuels, diesel

(68334-30-5) **ACGIH:** 100 mg/m³ (TWA); Skin; A3; Inhalable fraction and vapor (2007)

(68334-30-5) **OSHA:** No PEL established.

Distillates (petroleum), hydrotreated middle

(64742-46-7) **ACGIH:** A2; Exposure by all routes should be carefully controlled to levels as low as possible (2009); For Mineral oil, excluding metal working fluids; Poorly and mildly refined

(64742-46-7) **OSHA:** 5 mg/m³ (TWA); For Oil mist, mineral.

Distillates (petroleum), hydrotreated light

(64742-47-8) **ACGIH:** 100 ppm (TWA); (1980); For Stoddard solvent

(64742-47-8) **OSHA:** 500 ppm (TWA), 2900 mg/m³ (TWA); For Stoddard solvent.

Hydrogen sulfide (H₂S)

(7783-06-4) **ACGIH:** 1 ppm (TWA); 5 ppm (STEL); (2009)

(7783-06-4) **OSHA:** 20 ppm (C); 50 ppm (Peak) (Maximum duration: 10 mins. once only if no other meas. exp. occurs.)

10 ppm (TWA); 15 ppm (STEL) [Vacated]

PEL: Permissible Exposure Limit

TLV: Threshold Limit Value

TWA: Time-Weighted Average

STEL: Short-Term Exposure Limit

C: Ceiling

Engineering Controls:

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits. Use explosion-proof ventilation equipment.

Personal Protective Equipment

Eye/Face Protection:

Wear safety glasses. Ensure that eyewash stations are close to the workstation location.

Hand Protection:

Wear impervious gloves. Consult manufacturer specifications for further information.

Skin and Body Protection:

Wear suitable protective clothing. Flame resistant clothing such as Nomex ® is recommended in areas where material is stored or handled.

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 or self-contained breathing apparatus (SCBA) should 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.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Clear to pale yellow liquid.



Colour:	Clear to pale yellow.
Odour:	Petroleum.
Odour Threshold:	Not available.
Physical State:	Liquid.
pH:	Not available.
Viscosity:	Not available.
Melting Point:	-42 °C
Boiling Point:	170 to 370 °C
Flash Point:	44 °C to 60 °C (typically 53 °C) (PMCC)
Evaporation Rate:	Not available.
Lower Flammability Limit:	Not available.
Upper Flammability Limit:	Not available.
Vapor Pressure:	Not available.
Vapor Density:	4 (Air = 1)
Specific Gravity:	0.846 (Water = 1)
Density:	Not available.
Solubility in Water:	Insoluble.
Coefficient of Water/Oil Distribution:	Not available.
Auto-ignition Temperature:	Not available.
Percent Volatile, wt. %:	Not available.
VOC content, wt. %:	Not available.

Section 10: STABILITY AND REACTIVITY

Stability:	Stable under normal storage conditions.
Conditions of Reactivity:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Incompatible Materials:	Strong oxidizers.
Hazardous Decomposition Products:	Not available.
Possibility of Hazardous Reactions:	None known.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE



Component Toxicity

Component	CAS No.	LD₅₀ oral	LD₅₀ dermal	LC₅₀
Fuels, diesel	68334-30-5	7500 mg/kg, (rat)	>5000 µl/kg, (rabbit)	Not available.
Distillates (petroleum), hydrotreated middle	64742-46-7	Not available.	Not available.	Not available.
Distillates (petroleum), hydrotreated light	64742-47-8	Not available.	Not available.	Not available.
Hydrogen sulfide (H ₂ S)	7783-06-4	Not available.	Not available.	444 ppm, (rat),

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hydrogen sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations. Above 50 ppm H₂S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: May cause respiratory tract irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache, dizziness, confusion, loss of appetite and loss of consciousness. Hydrogen sulphide may cause symptoms such as digestive upset and loss of appetite, loss of sense of smell and pulmonary edema. At 500-1000 ppm Hydrogen sulphide may cause respiratory paralysis, collapse and death without rescue.

Skin Sensitization: Not hazardous by OSHA/WHMIS criteria.

Respiratory Sensitization: Not hazardous by OSHA/WHMIS criteria.

EFFECTS OF CHRONIC EXPOSURE

Target Organs: Skin. Eyes. Gastrointestinal tract. Respiratory system. Blood. Liver. Nervous system. Thymus.

Chronic Effects: Prolonged or repeated contact may dry skin and cause irritation. Diesel fuel may cause damage to the blood, thymus and liver through prolonged or repeated exposure. Hydrogen sulphide may reduce lung function; cause neurological effects such as headaches, nausea, depression and personality changes; eye and mucous membrane irritation: damage to cardiovascular system.

Carcinogenicity: Repeated skin contact with Diesel fuel has resulted in irritation and skin cancer in animals.

Component Carcinogenicity

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Fuels, diesel	A3	Group 3	Not listed.	Not listed.	Not listed.



Husky Energy

Diesel Max

MATERIAL SAFETY DATA SHEET

Date of Preparation: March 19, 2012

Distillates (petroleum), hydrotreated middle	A2	Not listed.	Not listed.	Not listed.	Not listed.
Distillates (petroleum), hydrotreated light	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Hydrogen sulfide (H2S)	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.

Reproductive Effects: Not hazardous by OSHA/WHMIS criteria.

Developmental Effects

Teratogenicity: Not hazardous by OSHA/WHMIS criteria.

Embryotoxicity: Not hazardous by OSHA/WHMIS criteria.

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.

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: TRANSPORTATION INFORMATION

CFR

Proper Shipping Name: UN 1202, DIESEL FUEL, 3, PG III

Class: 3

UN Number: 1202

Packing Group: III

Label Code:



TDG

Proper Shipping Name: UN 1202, DIESEL FUEL, 3, PG III



Husky Energy

MATERIAL SAFETY DATA SHEET

Diesel Max

Date of Preparation: March 19, 2012

Class: 3

UN Number: 1202

Packing Group: III

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

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.

WHMIS Classification: Class B3 - Combustible Liquids.
Class D2B - Skin irritant.
Class D2B - Eye irritant.

Hazard Symbols:



United States

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Fuels, diesel	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Distillates (petroleum), hydrotreated middle	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Distillates (petroleum), hydrotreated light	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Hydrogen sulfide (H2S)	500	100	100	313s	U135	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
Fuels, diesel	68334-30-5	Not listed.
Distillates (petroleum), hydrotreated middle	64742-46-7	Not listed.
Distillates (petroleum), hydrotreated light	64742-47-8	Not listed.
Hydrogen sulfide (H2S)	7783-06-4	E

Note: E = Extraordinarily Hazardous Substance

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
Fuels, diesel	68334-30-5	Not listed.
Distillates (petroleum), hydrotreated middle	64742-46-7	Not listed.
Distillates (petroleum), hydrotreated light	64742-47-8	Not listed.
Hydrogen sulfide (H2S)	7783-06-4	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
Fuels, diesel	68334-30-5	Not listed.
Distillates (petroleum), hydrotreated middle	64742-46-7	Not listed.
Distillates (petroleum), hydrotreated light	64742-47-8	Not listed.
Hydrogen sulfide (H2S)	7783-06-4	E

Note: E = Environmental Hazard; S = Special Hazardous Substance

California

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 his own particular use.

Expiry Date: March 18, 2015

Version: 1.0

MSDS Prepared by: Deerfoot Consulting Inc.

Phone: (403) 720-3700

MATERIAL SAFETY DATA SHEET**Fluorosilicic Acid****Section 01 - Chemical And Product And Company Information**

Product Identifier Fluorosilicic Acid

Product Use Water fluoridation and wood preservation.

Supplier Name..... ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon SK S7K 1V3
Canada

Prepared By..... ClearTech Industries Inc. Technical Department
Phone: 1 (800) 387-7503

24-Hour Emergency Phone..... 1 (800) 387-7503

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients..... Hydrofluorosilicic acid 23-27%

CAS Number..... Hydrofluorosilicic acid 16961-83-4

Synonym (s)..... Fluosilicic acid, hydrofluorosilicic acid, hydrofluosilicic acid, hexafluosilicic acid



Section 03 - Hazard Identification

- Inhalation**..... Irritating to nose, throat, and respiratory system. May be corrosive to respiratory system with prolonged contact. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.
- Skin Contact / Absorption**..... May cause irritation, redness or swelling with contact.
- Eye Contact**..... Contact may cause severe irritation, watering, redness and swelling.
- Ingestion**..... May cause nausea, vomiting, abdominal pain and burns if ingested.
- Exposure Limits**..... ACGIH-TLV: 2.5mg/m³ (as F)
OSHA-PEL: 2.5mg/m³ (as F)

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 medical attention if difficulties persist.
- 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. Give large amounts of water. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.
- Additional Information**..... Beware of late onset pulmonary edema for up to 48 hours. Treat severe burns as per hydrofluoric acid exposure with a calcium gluconate jelly.



Section 05 - Fire Fighting

- Conditions of Flammability**..... Non-flammable
- Means of Extinction**..... Product does not burn. Where fire is involved, use any fire fighting agent appropriate for surrounding material; use water spray to cool fire-exposed surfaces.
- Flash Point**..... Not Applicable
- Auto-ignition Temperature**..... Not Applicable
- Upper Flammable Limit** Not Applicable
- Lower Flammable Limit**..... Not Applicable
- Hazardous Combustible Products**... Corrosive fumes of hydrogen fluoride and silicon tetrafluoride will occur when decomposition occurs 105°C.
- Special Fire Fighting Procedures**.... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.
- Explosion Hazards**..... Not Available

Section 06 - Accidental Release Measures

- Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers and surface water. Dike spill area with sand or earth.
- Deactivating Materials**..... Small spills can be neutralized with hydrated lime.

Section 07 - Handling and Storage

- Handling Procedures**..... Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.
- Storage Requirements**..... Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials. Do not store in glass or stoneware. Most metals are incompatible so avoid contact.

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 cartridge respirator with full-face shield. Chemical cartridge should provide protection against acid fumes (hydrogen fluoride). For concentrations greater than 20ppm, a NIOSH approved self-contained breathing apparatus with full-face shield should be used.
- Gloves**..... Impervious gloves of chemically resistant material (rubber or neoprene) 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 proximity.

Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Colourless to pale yellow liquid with a pungent odour
- Odor Threshold**..... Not Available
- Specific Gravity (Water=1)**..... 1.234 at 15.6°C and 24% concentration
- Vapor Pressure (mm Hg, 20C)**..... 218 at 75°C
- Vapor Density (Air=1)**..... Not Available
- Evaporation Rate**..... Not Available
- Boiling Point**..... 105°C



Freeze/Melting Point..... -15°C

pH..... Approximately 1.0

Water/Oil Distribution Coefficient.... Not Available

Bulk Density..... 10.29lbs/gal at 25% concentration

% Volatiles by Volume..... Not Available

Solubility in Water..... Completely miscible.

Molecular Formula..... H_2SiF_6

Molecular Weight..... 144.08

Section 10 - Stability and Reactivity

Stability..... Stable under normal conditions.

Incompatibility..... Metals, glass, alkali, ceramics, and strong concentrated acids. Strong concentrated acids will cause the liberation of poisonous hydrogen fluoride. Hydrofluorosilicic acid will attack glass and ceramics. Metals will be corroded and liberate hydrogen gas.

Hazardous Products of Decomposition.. Stable at room temperature. Attacks glass and stoneware. Decomposes to form hydrogen fluoride and silicon tetrafluoride when heated. Heat is generated when product is added to water.

Polymerization..... Will not occur.

Section 11 - Toxicological Information

Irritancy..... Product is corrosive.

Sensitization..... Not Available

Chronic/Acute Effects..... Liquid or vapors can cause burns which may not be apparent for hours. Prolonged exposure can result in: bone changes; corrosive effect on mucous membranes; ulceration of nose, throat, and bronchial tubes; cough, shock, pulmonary edema, fluorosis, coma, and death.

Synergistic Materials..... Not Available

Animal Toxicity Data..... LD_{50} (oral, guinea pig): 200mg/kg



Carcinogenicity..... IARC: Group 3 carcinogen (listed as ** undefined **).

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

TDG Classification

Class..... 8

Group..... II

PIN Number..... UN 1778

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment.

Section 15 - Regulatory Information

WHMIS Classification.....E, D1

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 fluoridation at a maximum dosage of 6mg/L.



Section 16 - Other Information

Preparation Date..... February 8, 2011

Revision Date..... February 3, 2014
March 18, 2014

Note: The responsibility 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, and assume no liability for damages incurred by the use of this material. It is the responsibility 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 its 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.

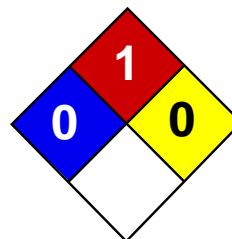
ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 306-664-2522
Fax: 306-665-6216

www.ClearTech.ca

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1 (800) 387-7503	1 (888) 281-8109
Port Coquitlam, B.C	2023 Kingsway Ave	V3C 1S9	1 (800) 387-7503	1 (888) 281-8109
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	1 (800) 387-7503	1 (888) 281-8109
Edmonton, AB.	11750 - 180 th Street	T5S 1N7	1 (800) 387-7503	1 (888) 281-8109
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	1 (800) 387-7503	1 (888) 281-8109
Regina, SK.	555 Henderson Drive	S42 5X2	1 (800) 387-7503	1 (888) 281-8109
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1 (800) 387-7503	1 (888) 281-8109
Mississauga, ON.	7480 Bath Road	L4T 1L2	1 (800) 387-7503	1 (888) 281-8109

24 Hour Emergency Number - All Locations – 1 (800) 387-7503



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Propylene glycol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Propylene glycol

Catalog Codes: SLP1162, SLP2974

CAS#: 57-55-6

RTECS: TY2000000

TSCA: TSCA 8(b) inventory: Propylene glycol

CI#: Not applicable.

Synonym: 1,2,-propanediol, 1,2-dihydroxypropane

Chemical Name: Propylene Glycol

Chemical Formula: CH₃CHOHCH₂OH

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
Propylene glycol	57-55-6	100

Toxicological Data on Ingredients: Propylene glycol: ORAL (LD50): Acute: 20000 mg/kg [Rat]. 22000 mg/kg [Mouse]. DERMAL (LD50): Acute: 20800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). 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. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. 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: May be combustible at high temperature.

Auto-Ignition Temperature: 371°C (699.8°F)

Flash Points: CLOSED CUP: 99°C (210.2°F). OPEN CUP: 107°C (224.6°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.5%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of heat.

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: When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

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. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. 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 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 gas/fumes/ vapor/spray. 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 oxidizing agents, reducing agents, acids, alkalis, moisture.

Storage:

Hygroscopic. 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:

Splash goggles. Lab coat. Vapor 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 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: 10 (mg/m³) from AIHA Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Practically Odorless.

Taste: Practically Tasteless.

Molecular Weight: 76.1g/mole

Color: Colorless. Clear

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

Boiling Point: 188°C (370.4°F)

Melting Point: -59°C (-74.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.036 (Water = 1)

Vapor Pressure:

0 kPa (@ 20°C) 0.08 mmHg at 20 C 0.129 mmHg at 25 C

Vapor Density: 2.62 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.9

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, acetone.

Solubility: Soluble in cold water, hot water, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat, exposure to moist air or water

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Hygroscopic; keep container tightly closed. Incompatible with chloroformates, strong acids (nitric acid, hydrofluoric acid), caustics, aliphatic amines, isocyanates, strong oxidizers, acid anhydrides, silver nitrate, reducing agents.

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): 18500 mg/kg [Rabbit]. Acute dermal toxicity (LD50): 20800 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant, permeator), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenic). May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause mild skin irritation. It may be absorbed through the skin and cause systemic effects similar to those of ingestion. Eyes: May cause mild eye irritation with some immediate, transitory stinging, lacrimation, blepharospasm, and mild transient conjunctival hyperemia. There is no residual discomfort or injury once it is washed away. Inhalation: May cause respiratory tract irritation. Ingestion: It may cause gastrointestinal tract irritation. It may affect behavior/central nervous system(CNS depression, general anesthetic, convulsions, seizures, somnolence, stupor, muscle contraction or spasticity, coma), brain (changes in surface EEG), metabolism, blood (intravascular hemolysis, white blood cells - decreased neutrophil function), respiration (respiratory stimulation, chronic pulmonary edema, cyanosis), cardiovascular system(hypotension, bradycardia, arrhythmias, cardiac arrest), endocrine system (hypoglycemia), urinary system (kidneys), and liver. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may cause allergic contact dermatitis. Ingestion: Prolonged or repeated ingestion may cause hyperglycemia and may affect behavior/CNS (symptoms similar to that of acute ingestion). Inhalation: Prolonged or repeated inhalation may affect behavior/CNS (with symptoms similar to ingestion), and spleen

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): >5000 mg/l 24 hours [Goldfish]. >10000 mg/l 48 hours [guppy]. >10000 mg/l 48 hours [water flea].

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:

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:**

Pennsylvania RTK: Propylene glycol Minnesota: Propylene glycol TSCA 8(b) inventory: Propylene glycol

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

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

DSCL (EEC):

R21/22- Harmful in contact with skin and if swallowed. S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 0

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

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 Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Supplier MSDS -LOLI -RTECS -HSDB

Other Special Considerations: Not available.

Created: 10/10/2005 08:24 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Material Safety Data Sheet

WHMIS	TDG Road/Rail	Health Hazard *	3
		Fire Hazard	0
		Reactivity	1
		Personal Protection	E

This MSDS is provided as information only. The product is not WHMIS regulated. The product is regulated under the PCP act and packaged as a consumer product.

1. Product and company identification

Product name : CAL DISC 320 **Code** : 30-24295
Date of issue (dd/mm/yyyy) : 2015-10-15. **Material uses** : Consumer products: Pool and Spa Water treatment agent.
Supplier : Chimie Internationales inc. **Manufacturer** : Manufactured for:
9585 ignace, **Manufacturer** : Chimie Internationales inc.
Brossard, Qc, J4Y 2R4 9585 ignace,
Brossard, Qc, J4Y 2R4

In case of emergency : **Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)**

2. Hazards identification

Potential hazards described in this section are not expected when manufacturer's direction for use and proper security measures are observed.

Physical state : Solid. [Powder. Leaflets. Pellets.] **Odor** : Pungent. [Strong]

Emergency overview : **WARNING!**
Fine dust clouds may form explosive mixtures with air. May be harmful if absorbed through skin or if swallowed. Severely irritating to the eyes, skin and respiratory system. Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat. Keep away from heat, sparks and flame. Prevent dust accumulation. Do not ingest. Do not get in eyes. Avoid breathing dust. Avoid contact with skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Severely irritating to the respiratory system.
Ingestion : Harmful if swallowed.
Skin : Harmful in contact with skin. Severely irritating to the skin.
Eyes : Severely irritating to eyes. Risk of serious damage to eyes.

See toxicological information (Section 11) for more details.

3. Composition/information on ingredients

Name	CAS number	% (w/w)
calcium hypochlorite	7778-54-3	60 - 100
calcium carbonate	471-34-1	1 - 5
calcium dihydroxide	1305-62-0	1 - 5
Calcium chloride (CaCl ₂), dihydrate	10035-04-8	1 - 5

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

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 20 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 20 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

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

5. Fire-fighting measures

Flammability of the product : Strong oxidizing agent.

Extinguishing media
Suitable : Use flooding quantities of water. USE WATER ONLY
Not suitable : Do not use water jet Do not use dry chemical extinguishers containing ammonium compounds.

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

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

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

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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

Methods for cleaning up
Small spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Place spilled material in a designated, labeled waste container. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor.

6. Accidental release measures

Large spill : Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Avoid creating dusty conditions and prevent wind dispersal. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. 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 dust. Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Prevent dust accumulation. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Electrical equipment and lighting should be protected to appropriate standards to prevent dust coming into contact with hot surfaces, sparks or other ignition sources. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Do not store above the following temperature: 52°C (125.6°F). 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.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
calcium dihydroxide	US ACGIH 3/2012	-	5	-	-	-	-	-	-	-	[3]
	AB 4/2009	-	5	-	-	-	-	-	-	-	
	BC 9/2011	-	5	-	-	-	-	-	-	-	
	ON 7/2010	-	5	-	-	-	-	-	-	-	
	QC 9/2011	-	5	-	-	-	-	-	-	-	
calcium carbonate	AB 4/2009	-	10	-	-	-	-	-	-	-	[3]
		-	10	-	-	-	-	-	-	-	[a]

[3]Skin sensitization
Form: [a]Total dust.

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. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required. No monitoring equipment are required if no occupational exposure limit values are suggested.

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

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.

Personal protection

Respiratory : Use a properly fitted, particulate filter 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: disposable particulate mask

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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): Chemical-resistant, impervious gloves
4 - 8 hours (breakthrough time): Chemical-resistant, impervious gloves
1 - 4 hours (breakthrough time): Chemical-resistant, impervious gloves
< 1 hour (breakthrough time): Chemical-resistant, impervious gloves

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. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. If operating conditions cause high dust concentrations to be produced, use dust goggles. Recommended: safety glasses with side-shields

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.

Personal protective equipment (Pictograms) :



9. Physical and chemical properties

Physical state	: Solid. [Powder. Leaflets. Pellets.]	Molecular formula	: Not applicable.	Flammable limits	: Not available.
Color	: White.	Molecular weight	: Not applicable.	Burning rate	: Not available.
Odor	: Pungent. [Strong]	Vapor pressure	: Not available.	Burning time	: Not available.
Relative density	: 2.35	Vapor density	: Not available.	Critical temperature	: Not available.
pH	: 10.4 [Conc. (% w/w): 1%]	Volatility	: Not available.	Auto-ignition temperature	: Not available.
Viscosity	: Not available.	Evaporation rate	: Not available.	Flash point	: [Product does not sustain combustion.]
Odor threshold	: 1.4 ppm	Ionicity (in water)	: Not available.	Dispersibility properties	: Not dispersible in the following materials: cold water and hot water.
Solubility	: Partially soluble in the following materials: cold water and hot water.				
Melting/freezing point	100.01°C (212°F)	Boiling/condensation point	: Not available.		

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). 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. Prevent dust accumulation.

Materials to avoid : Reactive or incompatible with the following materials:
oxidizing materials
Reactive or incompatible with the following materials: oxidizing materials, reducing materials, combustible materials, organic materials and acids.
This product is chemically reactive with many substances, including, other pool treatment products, acids, organics, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, corrosive, flammable or combustible materials.

10. Stability and reactivity

- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

The symptoms, hazards and situations described in this section are not expected when manufacturer's direction for use, proper security measures and given professional exposure limits are correctly followed.

Potential chronic health effects

- Chronic effects** : Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Target organs** : Contains material which may cause damage to the following organs: lungs, mucous membranes, gastrointestinal tract, upper respiratory tract, skin, eye, lens or cornea, stomach.

Over-exposure signs/symptoms

- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
- Ingestion** : No specific data.
- Skin** : Adverse symptoms may include the following:
irritation
redness
- Eyes** : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure

Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
calcium hypochlorite	LD50 Oral	Rat	850 mg/kg	-
calcium dihydroxide	LD50 Oral	Rat	7340 mg/kg	-
	LD50 Oral	Rat	7340 mg/kg	-
Calcium chloride (CaCl ₂), dihydrate	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	1000 mg/kg	-
	LD50 Oral	Rat - Male	3798 mg/kg	-
calcium carbonate	LD50 Oral	Rat	6450 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
calcium dihydroxide	Eyes - Severe irritant	Rabbit	-	10 milligrams	-
calcium carbonate	Eyes - Severe irritant	Rabbit	-	24 hours 750 Micrograms	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-

Carcinogenicity Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
calcium hypochlorite	-	3	-	-	-	-

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Exposure	Species
calcium hypochlorite	-	Acute EC50 0.073 ppm Fresh water	48 hours	Daphnia - Water flea - Daphnia magna - Larvae
	-	Acute LC50 55 µg/l Marine water	48 hours	Crustaceans - Common mud crab - Panopeus herbstii - Larvae
	-	Acute LC50 23 µg/l Fresh water	96 hours	Fish - Rainbow smelt - Osmerus mordax - Fry
calcium dihydroxide	-	Acute LC50 33884.4 µg/l Fresh water	96 hours	Fish - Zambezi barbel - Clarias gariepinus - Fingerling
Calcium chloride (CaCl ₂), dihydrate	OECD 201 Alga, Growth Inhibition Test	Acute EC50 2700 mg/l Growth rate	72 hours	Aquatic plants - Selenastrum capricornutum
	OECD 202 <i>Daphnia</i> sp. Acute Immobilization Test and Reproduction Test	Acute EC50 2400 mg/l	48 hours	Daphnia - Daphnia magna
	EPA	Acute LC50 19400 mg/l	48 hours	Crustaceans - Cyclops abyssorum preliinus
	EPA	Acute LC50 2770 mg/l	48 hours	Daphnia - Daphnia magna
	EPA	Acute LC50 13400 mg/l	96 hours	Fish - Gambusia affinis
	EPA	Acute LC50 10650 mg/l	96 hours	Fish - Lepomis macrochirus
	EPA	Acute LC50 4630 mg/l	96 hours	Fish - Pimephales promelas
calcium carbonate	-	Acute LC50 >56000000 µg/l Fresh water	96 hours	Fish - Western mosquitofish - Gambusia affinis - Adult
	-	Chronic NOEC 61 mg/g Fresh water	42 days	Fish - Rainbow trout, donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling)

13. Disposal considerations



Waste disposal : The generation of waste should be avoided or minimized wherever possible. 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. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. 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 spilled material and runoff and contact with soil, waterways, drains and sewers.

Waste stream : Not available.

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

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

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	1748	UN1748 CALCIUM HYPOCHLORITE DRY MIXTURE RQ (calcium hypochlorite)	5.1	II		Reportable quantity 15.385 lbs / 6.9846 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Classification	1748	UN1748 CALCIUM HYPOCHLORITE DRY MIXTURE	5.1	II		-

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.
WHMIS (Canada) : Not controlled under WHMIS (Canada).
Canadian lists : **CEPA Toxic substances**: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Canada inventory : All components are listed or exempted.
Other certification :

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.

16. Other information on the product

Label requirements : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED.

References : - Manufacturer's Material Safety Data Sheet.


MSDS prepared by:
QA and Documentation Department

Date of printing (YYYY-MM-DD) : 2015-10-15.

Date of issue (YYYY-MM-DD) : 2015-10-15.

Manufactured for:
Chimie Internationales inc.
9585 ignace,
Brossard, Qc, J4Y 2R4

Note: MSDS are valid for a 3 years period after the date of issue

 Indicates information that has changed from previously issued version.

Notice to reader

There are potential hazards to people and goods associated with the use of this product which are detailed in the present Material Safety Data Sheet (MSDS). To minimize potential hazards associated with this product it is of users responsibility to conform the directions for use and all other instructions provided in the Material Safety Data Sheet (MSDS) of this product. The manufacturer, distributors and suppliers of this product are exonerating themselves and consequently shall not be liable for any prejudice or damage of any kind, resulting from the use of this product which may not be in accordance with the directions for use or all the instructions provided in the present Material Safety Data Sheet (MSDS) or resulting from an unadvised use of the present product..

Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)



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 decomposition 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, phosphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates.

Special Remarks on Explosion Hazards:

Mixtures of sulfuric acid and any of the following can explode: 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, picrates, fulminates, 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 decomposition.

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 acetelyene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thallium (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 dilute 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) Teratogenicity: neither embryotoxic, fetotoxic, nor teratogenic 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 gastrointestinal 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 respiratory 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.**Created:** 10/09/2005 11:58 PM**Last Updated:** 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

SECTION I MATERIAL NAME / IDENTIFIER

C-CLEAR/CLEAR ALL

WHMIS: E

Manufacturer's Name: CAPO INDUSTRIES LTD
Street Address: 1200 CORPORATE DRIVE
City: BURLINGTON, ONTARIO
Postal Code: L7L 5R6

Emergency Telephone: Canutec (613) 996-6666 (Collect)

Chemical Name: Not applicable.
Chemical Family: Polynuclear Inorganic Salt
Chemical Formula: Not applicable.
Trade Name & Synonyms: Poly Aluminum Hydroxychlorosulphate
Molecular Weight: Not applicable.
Material Use: Flocculant.

SECTION II HAZARDOUS INGREDIENTS

Hazardous Ingredients	Approx Conc %	C.A.S. N.A. U.N. Number	LD 50 Specify Species & Route (Oral, RAT)	LC 50 Specify Species & Route (Inhal, RAT)
Aluminum Chloride Hydroxide Sulphate	15-40	39290-78-3	12.8 g/kg	Not available

SECTION III PHYSICAL DATA FOR MATERIAL

Physical State: Gas Liquid X Solid

Odour & Appearance: Clear, blue, odourless

Odour Threshold (Ppm): Not applicable

Specific Gravity: 1.20

Vapour Pressure (Mm): 17 mm/hg

Vapour Density (Air-1): Not applicable

Evaporation Rate: Not available

Boiling Point (C): 100 deg C

Freezing Point (C): -12 deg C

Solubility In Water (20c): Soluble

% Volatile (By Volume) 80% (water)

Ph: 2.20

Coefficient Of Water/Oil Distribution: Greater than 1

C-CLEAR/CLEAR ALL

Page 1

MATERIAL SAFETY DATA SHEET

SECTION IV - FIRE & EXPLOSION HAZARD OF MATERIAL

Flammability: Yes No **X**
If Yes, Under Which Conditions?: Not applicable
Means Of Extinction: Use media suitable to extinguish source of fire.
Special Procedures: Wear self contained breathing apparatus when fire fighting.
Flashpoint (Celsius) And Method: Not applicable
Autoignition Temperature (Celsius): Not applicable
Lower Explosion Limit (% By Volume): Not applicable
Upper Explosion Limit (% By Volume): Not applicable
Hazardous Combustion Products: None

EXPLOSION DATA

Sensitivity To Mechanical Impact: None **Sensitivity To Static Discharge:** None

SECTION V REACTIVITY DATA

Chemical Stability: Yes **X** No
If No, Under Which Conditions?: Not applicable
Incompatibility To Other Substances: Yes **X** No
If So, Which Ones: Strong oxidizers, strong reducing agents.
Reactivity And Under What Conditions: Reacts with aluminum or zinc to/from hydrogen gas.
Hazardous Decomposition Products: Hydrogen chloride gas.

SECTION VI TOXICOLOGICAL PROPERTIES OF MATERIAL

Route Of Entry:

: Skin Contact **X** :Skin Absorption : Eye Contact **X**
: Inhalation Acute :Inhalation Chronic : Ingestion **X**

EFFECTS OF ACUTE EXPOSURE TO MATERIAL

Skin: Irritant

Eye: Irritant, may cause burns.

Inhalation: None expected on short term use.

Ingestion: Small quantities – nausea, vomiting, stomach cramps. Large quantities – ulcerations and necrosis of the mucous membranes in the throat, mouth and esophagus in addition to small quantity effects, liver or kidney damage and intense thirst.

Effects Of Chronic Exposure To Material: Prolonged skin contact may cause dermatitis. Mists may irritate respiratory tract if exposure is prolonged.

Other Health Effects: None known.

Ld 50 Of Material (Specify Species And Routes): See Section II

Lc 50 Of Material (Specify Species And Routes): See Section II

Exposure (Limits): None Established

MATERIAL SAFETY DATA SHEET

Irritancy Of Material: Skin and eye irritant
Sensitization Of Material: None known
Synergistic Materials: None known.
Carcinogenicity, Mutagenicity, Reproductive Effects, Teratogenicity: None known.

SECTION VII PREVENTATIVE MEASURES PERSONAL PROTECTIVE EQUIPMENT

Gloves (Specify): Neoprene or rubber gloves if skin contact is likely.
Eye (Specify): Safety glasses if eye contact is likely.
Respiratory (Specify): If mists are encountered, use NIOSH-approved respirator.
Other (Specify): Impermeable clothing and foot wear if contact is likely.
Engineering Controls (e.g. Ventilation, Enclosed Process – Specify): None.
Leak And Spill Procedure: Soak spill with absorbent material and transfer to metal drums. Spill may be neutralized with soda ash to pH between 6 and 9.
Waste Disposal: Dispose absorbed material in accordance with federal, provincial and local government regulations.
Handling Procedures And Equipment: Avoid skin and eye contact. Avoid contact with aluminum and zinc.
Storage Requirements: Store in cool, dry area. Avoid temperatures above 40 deg C.
Special Shipping Information:
Transportation: Corrosive Liquid Acidic, Inorganic NOS
(Aluminum Chloride Hydroxide Sulphate)
Class: 8
Pkg. Group: III
P.I.N./Un: 3264 5 LT and under Ltd Qty

SECTION VIII FIRST AID MEASURES

Skin: Wash thoroughly with soap and water.
Eye: Flush eyes with plenty of water for 15 minutes. Seek medical attention.
Inhalation: No expected damage due to low volatility. Remove person to fresh air if mists are irritating.
Ingestion: Drink 2 or 3 glasses of water to dilute. Immediately contact a physician. Do not induce vomiting.

SECTION IX PREPARATION DATE OF M.S.D.S.

Prepared By (Group, Department, Etc.): Plant Chemist **Telephone:** (905) 332-6626
Preparation Date: May 20, 2006
Date Of Latest Revision/Review: December 12 , 2013

Additional Notes Or References:

While Capco Industries Ltd. believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Capco Industries Ltd. assumes legal responsibility. They are offered solely for your consideration and verification. 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.

MATERIAL SAFETY DATA SHEET

SECTION I MATERIAL NAME / IDENTIFIER

METASOL / SCALE & STAIN

WHMIS: D2B

Manufacturer's Name: CAPO INDUSTRIES LTD
Street Address: 1200 CORPORATE DRIVE
City: BURLINGTON, ONTARIO
Postal Code: L7L 5R6

Emergency Telephone: Canutec (613) 996-6666 (Collect)

Chemical Name: Not applicable
Chemical Family: Not applicable
Chemical Formula: Not applicable
Trade Name & Synonyms: Not applicable
Molecular Weight: Not applicable
Material Use: Chelating agent

SECTION II HAZARDOUS INGREDIENTS

Hazardous Ingredients	Approx Conc %	C.A.S. N.A. U.N. Number	LD 50 Specify Species & Route (Oral, RAT)	LC 50 Specify Species & Route (Inhal, RAT)
-----------------------	---------------	-------------------------	---	--

Sodium Salt of 1 Hydroxyethylidene-1.1 - Diphosphoric Acid	7-3	2809-21-4	3.1g/kg	10 g/kg
---	-----	-----------	---------	---------

SECTION III PHYSICAL DATA FOR MATERIAL

Physical State: Gas Liquid X Solid

Odour & Appearance: Clear, blue liquid

Odour Threshold (Ppm): Not applicable

Specific Gravity: 1.340

Vapour Pressure (Mm): Not applicable

Vapour Density (Air-1): Not applicable

Evaporation Rate: Not applicable

Boiling Point (C): 100 deg C

Freezing Point (C): 0 deg C

Solubility In Water (20c): Soluble

% Volatile (By Weight) 56.0%

Ph: 5.5

Coefficient Of Water/Oil Distribution: Not applicable

META SOL / SCALE & STAIN

MATERIAL SAFETY DATA SHEET

SECTION IV - FIRE & EXPLOSION HAZARD OF MATERIAL

Flammability: Yes No X
If Yes, Under Which Conditions?: Not applicable
Means Of Extinction: Use media suitable to extinguish source of fire.
Special Procedures: Wear self contained breathing apparatus when fire fighting.
Flashpoint (Celsius) And Method: None
Autoignition Temperature (Celsius): None
Lower Explosion Limit (% By Volume): None
Upper Explosion Limit (% By Volume): None
Hazardous Combustion Products: Oxides of carbon and phosphorus

EXPLOSION DATA

Sensitivity To Mechanical Impact: None **Sensitivity To Static Discharge:** None

SECTION V REACTIVITY DATA

Chemical Stability: Yes X No
If No, Under Which Conditions?: Not applicable
Incompatibility To Other Substances: Yes X No
If So, Which Ones: cyanides
Reactivity And Under What Conditions: None under normal conditions
Hazardous Decomposition Products: CO,CO2, oxides of phosphorus

SECTION VI TOXICOLOGICAL PROPERTIES OF MATERIAL

Route Of Entry:

: Skin Contact X :Skin Absorption : Eye Contact X
: Inhalation Acute :Inhalation Chronic : Ingestion X

EFFECTS OF ACUTE EXPOSURE TO MATERIAL

Skin: Product may irritate skin
Eye: Strong irritant- may cause burning
Inhalation: Severe irritation if mists are inhaled
Ingestion: Gastritis

Effects Of Chronic Exposure To Material: None known

Other Health Effects: None known

Ld 50 Of Material (Specify Species And Routes): See section II

Lc 50 Of Material (Specify Species And Routes): See section II

Exposure (Limits): Not established

Irritancy Of Material: Skin and eye irritant

Sensitization Of Material: None known

META SOL / SCALE & STAIN

MATERIAL SAFETY DATA SHEET

Synergistic Materials: None known
Carcinogenicity, Mutagenicity, Reproductive Effects, Teratogenicity: None known

SECTION VII PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

Gloves (Specify): Latex or rubber gloves if skin contact is likely
Eye (Specify): Safety glasses/goggles, if eye contact is likely
Respiratory (Specify): None
Other (Specify): None
Engineering Controls (e.g. Ventilation, Enclosed Process – Specify): General ventilation
Leak And Spill Procedure: Small spills: Absorb with synthetic or natural absorbent and dispose into waste Container. Large spills: Neutralize with soda ash and absorb with absorbent material And dispose.
Waste Disposal: Dispose absorbed material in accordance with Federal, Provincial and local Regulations.
Handling Procedures And Equipment: Avoid skin contact
Storage Requirements: Store in cool, dry area
Special Shipping Information: **Transportation:** Not regulated
Class:
Pkg. Group:
P.I.N./Un:

SECTION VIII FIRST AID MEASURES

Skin: Wash thoroughly with soap and water.
Eye: Flush eyes with plenty of water for 15 minutes. Seek medical attention if irritation persists
Inhalation: If mists are inhaled, seek immediate medical attention
Ingestion: Drink 2 or 3 glasses of water to dilute material, Induce vomiting. Contact a physician at once

SECTION IX PREPARATION DATE OF M.S.D.S.

Prepared By (Group, Department, Etc.): Plant Chemist **Telephone:** (905) 332-6626
Preparation Date: January 1, 1996
Date Of Latest Revision/Review: December 12,2013

Additional Notes Or References:

While Capo Industries Ltd. believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Capo Industries Ltd. assumes legal responsibility. They are offered solely for your consideration and verification. 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.

MATERIAL SAFETY DATA SHEET

SECTION I MATERIAL NAME / IDENTIFIER

OXY OUT/OXY CLEAR-NON- CHLORINE SHOCK WHMIS: D2B

Manufacturer's Name: CAPO INDUSTRIES LTD
Street Address: 1200 CORPORATE DRIVE
City: BURLINGTON, ONTARIO
Postal Code: L7L 5R6

Emergency Telephone: Canutec (613) 996-6666 (Collect)

Chemical Name: Oxone
Chemical Family: Monopersulphate
Chemical Formula: 2KHSO5 KHSO4 K2S04
Trade Name & Synonyms: Potassium Monopersulphate
Molecular Weight: Not applicable
Material Use: Pool Water Treatment Chemical

SECTION II HAZARDOUS INGREDIENTS

Hazardous Ingredients	Approx Conc %	C.A.S. N.A. U.N. Number	LD 50 Specify Species & Route (Oral, RAT)	LC 50 Specify Species & Route (Inhal, RAT)
Potassium Peroxymono Sulphate	30-60	10058-23-8	Not available	Not available
Potassium Bisulphate	10-30	7646-93-7	Not available	Not available
Potassium Sulphate	15-40	7778-80-5	Not available	Not available
Magnesium Carbonate	1-5	546-93-0	Not available	Not available

SECTION III PHYSICAL DATA FOR MATERIAL

Physical State: Gas Liquid Solid X

Odour & Appearance: White, granular, opaque, odourless

Odour Threshold (Ppm): Not applicable

Specific Gravity: 1.1 to 1.4

Vapour Pressure (Mm): Not applicable

Vapour Density (Air-1): Not applicable

Evaporation Rate: Not applicable

Boiling Point (C): Not applicable

Freezing Point (C): Decomposes

Solubility In Water (20c): 25.6% @ 20 deg C

% Volatile (By Volume) Not applicable

Ph: 2.30 (1% solution)

Coefficient Of Water/Oil Distribution: Not applicable

MATERIAL SAFETY DATA SHEET

SECTION IV - FIRE & EXPLOSION HAZARD OF MATERIAL

Flammability: Yes No **X**
If Yes, Under Which Conditions?: Not applicable. NOTE: Grinding or intensive mixing may cause ignition or oxidizable material present.
Means Of Extinction: Use media suitable to extinguish source of fire.
Special Procedures: Wear self-contained breathing apparatus when fire fighting.
Flashpoint (Celsius) And Method: Not applicable
Autoignition Temperature (Celsius): Not applicable
Lower Explosion Limit (% By Volume): Not applicable
Upper Explosion Limit (% By Volume): Not applicable
Hazardous Combustion Products: Not applicable

EXPLOSION DATA

Sensitivity To Mechanical Impact: None **Sensitivity To Static Discharge:** None

SECTION V REACTIVITY DATA

Chemical Stability: Yes **X** No
If No, Under Which Conditions?: Not applicable
Incompatibility To Other Substances: Yes **X** No
If So, Which Ones: This product is an oxidizer. When mixed with halides (chlorine, bromine) or compounds containing halides, it will release the respective halogen gas. Examples: Mixture of this product and salt will emit chlorine gas. Mixture with cyanides can release hydrogen cyanide gas. Heavy metal salts such as cobalt, nickel and copper cause the evolution of oxygen.
Reactivity And Under What Conditions: See above.
Hazardous Decomposition Products: Releases oxygen gas.

SECTION VI TOXICOLOGICAL PROPERTIES OF MATERIAL

Route Of Entry:
: Skin Contact **X** :Skin Absorption : Eye Contact **X**
: Inhalation Acute :Inhalation Chronic : Ingestion **X**

EFFECTS OF ACUTE EXPOSURE TO MATERIAL

Skin: Skin contact may cause irritation and burns.
Eye: Eye contact may cause irritation and burns.
Inhalation: Will cause irritation of mucosal membrane and respiratory passages.
Ingestion: Gastritis possibility progressing to necrosis or haemorrhage.

Effects Of Chronic Exposure To Material: None known.

Other Health Effects: None known

Ld 50 Of Material (Specify Species And Routes): Oral Rat – 2000 mg/kg, Skin absorption Rabbit - > 11,000 mg/kg

Lc 50 Of Material (Specify Species And Routes): 4 hr inhalation Rat - > 5 mg/kg

MATERIAL SAFETY DATA SHEET

Exposure (Limits): OSHA PEL particulates not otherwise classified: 15 mg/m³, 8 hr, TWA Total Dust; 5 mg/m³, 8 hr, TWA Respirable Dust.

Irritancy Of Material: Skin, eye, nose and throat.

Sensitization Of Material: None known.

Synergistic Materials: None known.

Carcinogenicity, Mutagenicity, Reproductive Effects, Teratogenicity: None known.

SECTION VII

PREVENTATIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT

Gloves (Specify): Latex or rubber gloves if skin contact is likely.

Eye (Specify): Safety glasses/goggles if eye contact is likely.

Respiratory (Specify): NIOSH/MSHA air purifying respirator if prolonged use in non-ventilated area is unavoidable.

Other (Specify): Impervious clothing if contact is likely.

Engineering Controls (e.g. Ventilation, Enclosed Process – Specify): Use in well ventilated area. Local ventilation may be required to keep particulates below OSHA-PEL.

Leak And Spill Procedure: Sweep up and collect in a metal container. Flush residue with water. Large quantities should be neutralized with soda ash.

Waste Disposal: Dispose material in accordance with federal, provincial and local government regulations.

Handling Procedures And Equipment: Avoid contact with eyes, skin and clothing. Avoid breathing dust. Wash thoroughly after handling.

Storage Requirements: Store in cool, dry area. Do not mix directly with other chemicals. Do not store with combustible materials.

Special Shipping Information:

Transportation:	Corrosive Solid Acidic- Inorganic N.O.S. (Monopersulphate Compound)
Class:	8
Pkg. Group:	II
P.I.N./Un:	3260 1Kg and under Ltd Qty.

SECTION VIII

FIRST AID MEASURES

Skin: Wash thoroughly with soap and water. Flush with water for 15 minutes.

Eye: Flush eyes with plenty of water for 15 minutes. Seek medical attention.

Inhalation: Remove person to fresh air. Give artificial respiration if required. Seek medical attention.

Ingestion: Drink large quantities of water and contact a physician.

MATERIAL SAFETY DATA SHEET

SECTION IX

PREPARATION DATE OF M.S.D.S.

Prepared By (Group, Department, Etc.): Plant Chemist Telephone: (905) 332-6626

Preparation Date: July 16, 1999
Date Of Latest Revision/Review: December 12, 2013
Additional Notes Or References:

While Capo Industries Ltd. believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Capo Industries Ltd. assumes legal responsibility. They are offered solely for your consideration and verification. 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.

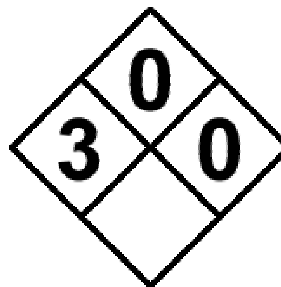


MURIATIC ACID

Material Safety Data Sheet

Emergency 24 Hour Telephone: CHEMTREC 800.424.9300

Corporate Headquarters: Hasa Inc.
23119 Drayton Street
Saugus, California 91350
Telephone • 661.259.5848
Fax • 661.259.1538



HASA MURIATIC ACID
Material Safety Data Sheet MSDS No. 110

IDENTIFICATION OF PRODUCT

Product Name:	HASA MURIATIC ACID
Common Chemical Names:	31.45% Hydrochloric Acid, HCl
Chemical Names of Ingredients:	Hydrogen Chloride, Water
Chemical Family:	Inorganic Acid
CAS Registry Number:	7647-01-0
Empirical Formula:	HCl
Molecular Weight:	36.46 [Hydrogen Chloride]

PHYSICAL AND CHEMICAL PROPERTIES¹

Vapor Pressure:	35 mm Hg at 25°C [77°F]	Flash Point:	Not Applicable.
Weight/Gallon:	9.6 lbs [4.4 kg]	pH:	1% solution less than 1.0
Density [liquid]:	1.16 at 15.6°C [64°F]	Odor:	Irritating, pungent, acidic
Bulk Density:	Not Applicable.	Boiling Point:	83°C [181.4°F] at 760mm Hg
Melting Point:	Not Applicable.	Freezing Point:	-46°C [-50.8°F]
Physical State:	Solution	Color:	Straw Yellow to water white
Solubility in Water:	Complete	Stability:	Stable

PHYSICAL HAZARDS

Potential for Fire:	Nonflammable
Potential for Explosion:	Forms flammable hydrogen gas on contact with metals.
Reactivity:	Will react with caustic materials, oxidizing materials and metals [zinc, galvanized iron, brass, aluminum, copper and copper alloys, etc.] Hazardous polymerization will not occur.
Extinguishing Media:	Use water spray or fog nozzle to keep containers cool.
Fire Fighting Procedures:	Wear self-contained breathing apparatus and protective clothing.

HEALTH HAZARDS	
Signs and Symptoms of Exposure:	Eyes and skin burns. Not a skin sensitizer.
Medical Conditions Aggravated by Exposure:	No data available.
Oral [ingestion] LD₅₀:	900 mg/kg ² [rat]
Dermal [skin absorption] LD₅₀:	No data available.
Inhalation [breathing] LC₅₀:	3124 ppm [1 hour, rat] ³
Eye Irritation:	Corrosive. Will burn eyes on contact. ⁴
Skin Irritation:	Corrosive. Not considered to be a skin sensitizer. ⁵
OSHA PEL:	5 ppm [ceiling] ⁶
ACGIH TLV/TWA:	5 ppm [as HCl] ⁷

POTENTIAL ROUTE [S] OF ENTRY	
Inhalation [Breathing]:	Inhalation of fumes.
Dermal [Skin]:	Liquid contact.
Eyes:	Fumes and/or liquid contact.
Ingestion:	Swallowing of liquid.

AQUATIC AND ENVIRONMENTAL TOXICITY	
96-hour LC₅₀ [Mosquito Fish]:	282 mg/l ⁸
96-hour LC₅₀ [Blue Gill]:	100% pH lowered to 3.6 ⁹

CARCINOGENIC [CANCER POTENTIAL] INFORMATION	
No evidence of bone, lung, or nasal tumors found in rats chronically exposed to HCl vapors. ¹⁰	
National Toxicological Program [NTP] <i>Sixth Annual Report on Carcinogens</i>:	Not listed.
International Agency for Research on Cancer [IARC] <i>Monographs, V. 1-53, Supps. 1-8</i>:	Not listed.
Listed by Federal OSHA as Carcinogens:	Not listed.
Safe Drinking Water and Toxic Enforcement Act of 1986 [Proposition 65, California only]:	Not listed.

GENERAL PRECAUTIONS FOR SAFE USE AND HANDLING
Store in a cool, dry place. Do not mix with alkaline materials or metals. Keep container closed and protected against physical damage. Separate from incompatible materials in storage areas. Store separated from oxidizers. Keep containers closed when not in use. Keep out of the reach of children.

PERSONAL PROTECTION AND HYGIENE
Wear rubber gloves and eye protection when handling. Goggles should be vapor proof. Wash hands after handling. Provide ventilation for storage and use areas. Wear impervious clothing when handling and using this product. Do not breathe vapor. Avoid contact with skin and clothing.

CLEAN-UP OF SPILLS
Neutralize liquid with soda ash, sodium sesquicarbonate, slaked lime, or sodium bicarbonate and flush to a sanitary sewer.

FIRST AID	
Eye Contact:	Flush with water. Remove contact lenses [if applicable]. Hold eyelids open. Continue flushing with water for 15 minutes. Get prompt medical attention.
Skin Contact:	Wash affected area with water for 15 minutes. Get medical attention.
Ingestion [swallowing]:	Drink large quantities of water. DO NOT induce vomiting. Call a physician or poison control center immediately.
Inhalation:	Move to a safe area. If not breathing, give artificial respiration. Call a physician immediately.

FEDERAL/STATE LISTS/REGISTRATIONS/REPORTING REQUIREMENTS	
CERCLA Hazardous Substance [Section 1010 [4], P.L. 96-510]:	RQ 5,000 lbs [17,100 gallons based on HCl in solution]
Extremely Hazardous Substance [40 CFR 355, Appendix A]:	Not listed.
Pesticide Product 7 U.S.C. 136 et seq.:	Not registered.
Toxic Substance under TSCA:	Yes
Pesticide Product [various State Laws]:	Not used for pesticidal purposes.
Department of Agriculture:	GRAS when used in accordance with good manufacturing practices.

MATERIAL CLASSIFICATION	
OSHA Hazard Communication Standard, Department of Labor, Occupational Safety and Health Division, 29 CFR 1910.1200:	Corrosive Liquid
Department of Transportation CFR 49 Shipping Description:	Hydrochloric Acid, 8, UN 1789, P.G. II [4-1 gallon returnable bottles in plastic crate add "DOT-E-6614" after "P.G. II."]

National Fire Protection Association NFPA 704 [1990]:	3-0-0
BOCA National Fire Prevention Code/National Building Code [1999 editions]:	Corrosive Liquid
Standard Fire Prevention Code/Standard Building Code [1997 editions]:	Corrosive Liquid
Uniform Fire Code/Uniform Building Code [1997 editions]:	Corrosive Liquid
Uniform Fire Code Standards 79-3, Uniform Fire Code, V. II [1997 edition]:	3-0-0

FOOTNOTES [REFERENCES]

- ¹ E.I. Dupont de Nemours Company, Memo [January 31, 1990]
² *Biochemische Zeitschrift* [Berlin, Germany] 134, 437, 23
³ MacEwan, J.D. and E.H. Vernot, *NTIS Pub. No. Ad-AO31860* [1976] [CA 86:13442x][J-2798]: Vernot E. H. et al., *Toxicology and Applied Pharmacology*, 422 [2]:97-100 [1975]; Wohlsliegel, J. et al., *Aerospace Medical Research Laboratories*, AMRL-TR-125, pp. 275-285 [1975]; Wohlsliegel, J. et al., *Journal Combustion Toxicology*, 3[2]:61-70, [1976].
⁴ Griffith, J.F. et al, *Toxicology and Applied Pharmacology*, 55[3]: 501-513 [1081].
⁵ Gad, S.C. et al., *Toxicology and Applied Pharmacology*, 84[1]: 93-114.
⁶ 29 CFR 1910.1000
⁷ *ACGIH Bulletin*.
⁸ Wallen, I.E. et al., *Sewage Industrial Wastes*, 29:695 [1957] cited in McKee, J.E. et al., *Water Quality Criteria*. 2nd Edition, 1963.
⁹ Calms, J. Jr., et al., *Proceedings 13th Ind. Wastes Conf.*, Purdue University Engineering Bulletin, 43:243-252 [1959].
¹⁰ Albert, R.E., et al., *Journal National Cancer Institute*, 68[4]:597-603 [1982]; Ballou, J.E. et al., *Pac. Northwest Lab Annu. Re. DOE Asst. Sec. Environ. Report No. PNL-2500-Pt. 1, 6.1-6.2* [1978]; Sellakumar, A.R. et al., *Proceedings American Association of Cancer Research*, 24:94 [1083].

Please Note: The information contained herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge and belief. NO WARRANTY OR GUARANTEE, expressed or implied, is made regarding the product performance, product stability, or as to any other condition of use, handling, transportation, and storage. Customer use, handling, transportation, and storage may involve additional safety and/or performance considerations. Our technical personnel will be happy to respond to questions regarding safe handling, storage, transportation and use procedures. The safe handling, storage, transportation and use procedures remain the sole responsibility of the customer. No suggestions for handling, storage, transportation or use are intended as or to be construed as recommendations which may infringe on any existing patents or violate any Federal, State, and/or local law and/or regulation, ordinance, standard, etc.. This Material Safety Data Sheet has been prepared by HASA, Inc. staff from test reports and other information available in the public domain.



MATERIAL SAFETY DATA SHEET

NON-HAZARDOUS SUBSTANCE ACCORDING TO WORKSAFE AUSTRALIA

1. IDENTIFICATION

Product Name: Poly Aluminium Chloride

Other Names: PAC

Recommended Uses: A special basic salt of aluminium chloride designed to give much stronger coagulating flocculating power than ordinary aluminium and iron salts.

Supplier Name: Telford Industries

Street Address: 7 Valentine Street, Kewdale WA 6105

Telephone: 1800 835 115

Facsimile: 1800 835 222

Emergency Telephone Number: 0409 313 441

2. HAZARDS IDENTIFICATION

This material is non-hazardous according to health criteria of NOHSC Australia.

Hazard Category:

C Corrosive

Risk Phrase(s):

R34 Causes burns.

R37 Irritating to respiratory system.

Safety Phrase(s):

S22 Do not breath dust.

S24/25 Avoid contact with skin and eyes.

S28 After contact with skin, wash immediately with plenty of water, followed by a 3% Sodium Bicarbonate solution in water.

3. COMPOSITION / INGREDIENTS INFORMATION

CHEMICAL NAME	CAS NUMBER	PROPORTION
Poly Aluminium Chloride	1327-41-9	100%

4. FIRST AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre (Phone 131 126)

Inhalation: Remove victim from exposure to fresh air. If rapid recovery does not occur, seek medical attention.

Skin Contact: Remove affected clothing including footwear and wash affected area with a gentle stream of water for 15 minutes. If irritation occurs seek medical advice.

Eye Contact: Immediately flush eyes with plenty of water holding eyelids open. If irritation persists, seek medical attention.

Ingestion: Rinse mouth with water. Give water to drink provided person is conscious. Do NOT induce vomiting. Seek medical attention.

Notes to physician: Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Specific Hazards: Material is non-flammable and non-explosive. Severe overheating may produce hydrogen chloride gas.

Fire-fighting further advice: Material is non-flammable. Severe overheating may produce hydrogen chloride gas. Reacts with alkaline products. Corrosive to metals. Releases acidic vapours upon decomposition. Hazardous polymerisation has not been reported.

Suitable extinguishing media: Fire-fighters should wear full protective clothing including self-contained breathing apparatus. Use water spray, foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem Code: Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Spills & Disposal: Sweep up but avoid generating dust. Collect and place in properly labelled containers for disposal. Residues may be flushed to drain with large amounts of water if permitted.

Clean-up personnel should wear full protective clothing including breathing apparatus in dusty conditions. Prevent drain or sewer contamination. Keep people away from spill - becomes slippery when wet.

Dangerous Goods - Initial Emergency Response Guide No: Not applicable.

7. HANDLING AND STORAGE

Handling: Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling.

Storage: Not defined as a Dangerous Good by the Australian Code for the Transport of Dangerous Goods by Road and Rail. Store in a cool place out of direct sunlight. Store in well ventilated area. Store away from oxidising agents and foodstuffs. Prevent severe overheating as overheating may produce hydrogen chloride gas.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National Exposure Standards: No exposure standard has been established for this product by the Australian Safety and Compensation Council (ASCC).

Biological Limit Values: No information available on biological limits for this product.

Engineering Controls: A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. 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.

Personal Protective Equipment: Respiratory protection: Wear an approved dust mask. Skin protection: wear overalls. Hand protection: Wear protective rubber gloves. Eye protection: Wear safety chemical goggles. Always wash hands before smoking, eating, drinking or using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odour: Pale, yellow, hygroscopic powder.

pH: 3.5-5.0

Vapour Pressure: Not available

Vapour Density: Not available

Boiling Point/Range °C: 100-200°C

Melting Point/Range °C: Not available.

Solubility in Water: Soluble

Specific Gravity: 1.18-1.22

Flash Point (°C): Not available

Flammability Limits (%): Not available

Ignition Temperature (°C): Not available

Molecular Formula: Not available.

Additional Information:

(Typical values only – consult specification sheet)

10. STABILITY AND REACTIVITY

Chemical Stability: Product is stable under normal conditions of use, storage and temperature.

Conditions to Avoid: No data available.

Incompatible Materials: No data available.

Hazardous Decomposition Products: No data available.

Hazardous Reactions: No data available.

11. TOXICOLOGICAL INFORMATION

Inhalation: Inhalation of dust may irritate the mucous membranes.

Skin Contact: May cause skin irritation with prolonged contact.

Eye Contact: May cause eye irritation.

Ingestion: May cause nausea, vomiting and respiratory irritation.

Long Term Effects: No data available.

Acute Toxicity / Chronic Toxicity: Oral LD50 = not available Dermal LD50 = not available
Inhalation LC50 = not available No carcinogenic, mutagenic or teratogenic effects have been reported.

12. ECOLOGICAL INFORMATION

Ecotoxicity: No information available.

Persistence & Degradability: No information available.

Mobility: No information available.

13. DISPOSAL CONSIDERATIONS

Refer to State/Territory Land Waste Management Authority.

14. TRANSPORT INFORMATION

Classified as Non Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG code) for transport by road and rail.

UN No:	Not applicable.
Dangerous goods Class:	Not applicable.
Packing Group:	Not applicable.
Hazchem Code:	Not applicable.
Proper Shipping Name:	POLY ALUMINIUM CHLORIDE

15. REGULATORY INFORMATION

Poisons Schedule (Aust): Not available.

16. OTHER INFORMATION

Telford Industries reserves the right to change the chemical specifications without notice.

Material Safety Data Sheets are updated frequently. Please ensure that you have a current copy.

This MSDS summarises Telford Industries best knowledge of the health and safety hazard information of the selected substance and how to safely handle the selected substance in the workplace however Telford Industries expressly disclaims that the MSDS is a representation or guarantee of the chemical specifications for the substance. Each user should read the MSDS and consider the information in the context of how the selected substance will be handled and used in the workplace including its use in conjunction with other substances.

END OF MSDS



TELFORD INDUSTRIES

Telephone: 1800 835 115
Facsimile: 1800 835 222
Email: info@telfordindustries.com.au
Web: www.telfordindustries.com.au

MATERIAL SAFETY DATA SHEET**Sodium Bisulphate****Section 01 - Chemical And Product And Company Information**

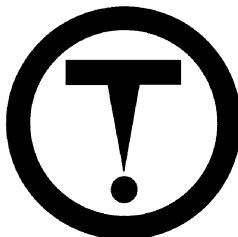
Product Identifier Sodium Bisulphate

Product Use Industrial pH adjuster, activating acid in formulated dry-acid cleaners,
and metal cleaning compounds, disinfectant

Supplier Name ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK. Canada
S7K 1V7

Prepared By ClearTech Industries Inc. Technical Department
Phone: 1 (800) 387-7503

24-Hour Emergency Phone 1 (800) 387-7503

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients Sodium Bisulphate >90%

CAS Number Sodium Bisulphate 7681-38-1

Synonym (s) Sodium acid sulphate, GBS, globular sodium bisulphate, nitre cake,
sodium hydrogen sulfate, sodium acid sulfate, and monosodium salt.



Section 03 - Hazard Identification

- Inhalation**..... Dust or mist inhalation may irritate nose, throat, and lungs and may cause respiratory tract irritation and lun edema.
- Skin Contact / Absorption**..... Prolonged contact may result in skin irritation such as redness, pain, and severe burns.
- Eye Contact**..... Can cause mild to severe irritation due to being an acidic irritant. May cause abrasive damage due to crystalline dust. May cause burns if eyes are not flushed with water.
- Ingestion**..... Small amount are not likely to cause injury, however, large amounts igested can cause severe burns of mouth, throat, and stomach. Also may cause sore throat, vomiting, and diarrhea.
- Exposure Limits**..... No established limits. Treat as nuisance particulates.
ACGIH-TLV: 10mg/m³ (total respirable dust)

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 medical attention if difficulties persist.
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with water for at least 15 minutes. Wash clothing before reuse. 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 if irritation persists.
- 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. Seek immediate medical attention.
- Additional Information**..... Not Available

Section 05 - Fire Fighting

- Conditions of Flammability**..... Not a specific fire or explosive hazard.
- Means of Extinction**..... Product does not burn. Use appropriate extinguishing media for material that is supplying the fuel to the fire. Avoid contacting material with water as it readily dissolves in water to form a weak acid solution.



Flash Point.....Not Applicable

Auto-ignition Temperature..... Not Applicable

Upper Flammable Limit Not Applicable

Lower Flammable Limit..... Not Applicable

Hazardous Combustible Products.... When heated to decomposition at 430°C, oxides of sulphur are formed.

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing. If water has to be used, wear acid protective equipment. A self-contained breathing apparatus should be worn if temperatures > 430°C.

Explosion Hazards..... None

Section 06 - Accidental Release Measures

Leak / Spill..... Wear appropriate personal protective equipment as suggested in Section 8. Vacuum or shovel spilled material and place into disposal container. Dilute residual material with water and discharge as per local, provincial and/or federal regulations permit.

Deactivating Materials.....Not Available

Section 07 - Handling and Storage

Handling Procedures.....Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid breathing in dust.

Storage Requirements..... Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials. Material is hygroscopic, do not store material where moisture is present. Storage near strong alkalis must be avoided.

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**.....For dusty areas > 10mg/m³, NIOSH-approved respirator for dust respirator should be worn.
- Gloves**..... Impervious gloves of chemically resistant material (rubber) should be worn. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... No special footwear is required other than what is mandated at place of work.

Engineering Controls

- Ventilation Requirements**.....Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided to keep particulate below 10mg/m³. Supply sufficient replacement air to make up for air removed by exhaust systems.
- Other**.....Not Available

Section 09 - Physical and Chemical Properties

- Physical State**.....Solid
- Odor and Appearance**..... Off-white powder and odorless
- Odor Threshold**.....Not Available
- Specific Gravity (Water=1)**..... Not Available
- Vapor Pressure (mm Hg, 20C)**.....Not Available
- Vapor Density (Air=1)**..... Not Applicable
- Evaporation Rate**..... Not Available
- Boiling Point**..... Not Available
- Freeze/Melting Point**..... 177°C
- pH**.....<1 (5% solution)
- Water/Oil Distribution Coefficient**..... Not available
- Bulk Density**..... 1.281-1.361 g/cm³
- % Volatiles by Volume**..... Not Available
- Solubility in Water**.....Partially soluble in hot and cold water.



Molecular Formula.....NaHSO₄

Molecular Weight.....120.06

Section 10 - Stability and Reactivity

Stability..... Stable under normal conditions. Avoid storage where moisture is present.

Incompatibility..... Incompatible with strong bases, hypochlorites and ammonium compounds.

Hazardous Products of Decomposition.. Will dissolve in water to form a weak sulphuric solution. Upon decomposition due to extreme heating, oxides of sulphur may form. Reacts with strong bases to evolve heat. Reacts with hypochlorites to form poisonous chlorine gas.

Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Mild irritant

Sensitization..... Not Available

Chronic/Acute Effects..... None other than what is listed in Section 3.

Synergistic Materials..... Not Available

Animal Toxicity Data..... LD₅₀(oral, rat): 2800mg/kg

Carcinogenicity..... Not considered to be carcinogenic by IARC, NTP, OSHA and ACGIH.

Reproductive Toxicity..... Not Available

Teratogenicity..... Not Available

Mutagenicity..... Not Available



Section 12 - Ecological Information

Fish Toxicity..... Product dissolves readily in water to form a weak acid, a 0.05% or greater (by weight) solution of this product is very likely to be harmful to aquatic life.

Biodegradability..... Material will decompose in soil. No adverse effects have been noticed when applied directly to crops.

Environmental Effects..... Although material will decompose in soil, excessive quantities should not be applied. No other significant effects or hazards are known.

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

TDG Classification

Class..... 8

Group..... III

PIN Number..... UN 3260

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment.

Section 15 - Regulatory Information

WHMIS Classification..... D2

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.



Section 16 - Other Information

Preparation Date..... January 5, 2011

Revision Date..... January 14, 2014
March 18, 2014

Note: The responsibility 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, and assume no liability for damages incurred by the use of this material. It is the responsibility 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 its 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: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7

Phone: 306-664-2522

Fax: 306-665-6216

www.ClearTech.ca

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1 (800) 387-7503	1 (888) 281-8109
Port Coquitlam, B.C.	2023 Kingsway Ave	V3C 1S9	1 (800) 387-7503	1 (888) 281-8109
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	1 (800) 387-7503	1 (888) 281-8109
Edmonton, AB.	11750 - 180 th Street	T5S 1N7	1 (800) 387-7503	1 (888) 281-8109
Saskatoon, SK.	1500 Quebec Avenue	S7K 1V7	1 (800) 387-7503	1 (888) 281-8109
Regina, SK.	555 Henderson Drive	S4Z 5X2	1 (800) 387-7503	1 (888) 281-8109
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1 (800) 387-7503	1 (888) 281-8109
Mississauga, ON.	7480 Bath Road	L4T 1L2	1 (800) 387-7503	1 (888) 281-8109

24 Hour Emergency Number - All Locations - 1 (800) 387-7503

MATERIAL SAFETY DATA SHEET**Sodium Hydroxide Solution****Section 01 - Product And Company Information**

Product Identifier Sodium Hydroxide Solution [4-50%]

Product Use Acid neutralization, petroleum refining, manufacture of paper products, metal cleaning, regeneration of ion exchange resins.

Supplier Name ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK. Canada
S7K 1V7

Prepared By ClearTech Industries Inc. Technical Department
Phone: (306)664-2522

Preparation Date May 17, 2013

24-Hour Emergency Phone 306-664-2522

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients	Sodium Hydroxide	<= 50%
CAS Number	Sodium Hydroxide	1310-73-2
Synonym (s)	Caustic soda, sodium hydrate, lye, liquid caustic, caustic	

Section 03 - Hazard Identification

Inhalation..... Inhalation is only likely to occur if an aerosol is formed as sodium hydroxide does not readily form a vapour. Exposure to aerosol may lead to irritation of respiratory tract, inflammation of lungs, difficulty breathing. May cause pulmonary edema.



- Skin Contact / Absorption**..... Severe burning, frequently deep ulcerations and ultimate scarring. Destructive effect on tissues.

- Eye Contact**..... Instantaneous painful irritation of the eyes. Can penetrate deeply causing irritation or severe burns depending on the concentration and duration of exposure. In severe cases, ulceration and blindness may occur.

- Ingestion**..... Burning of the mouth, throat, and esophagus; vomiting; diarrhea; edema; swelling of larynx; and subsequent suffocation. Perforation of gastrointestinal tract can occur.

- Exposure Limits**..... ACGIH/TLV-TWA: 2mg/m³ (8 hrs)

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**..... Check for and remove any contact lenses. 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 a cup of water to dilute chemical in stomach. If vomiting occurs, give another cup of water after vomiting. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.

- Additional Information**..... Not available

Section 05 - Fire Fighting Measures

- Conditions of Flammability**..... Non-flammable. Reaction with metals may generate explosive hydrogen gas.

- Means of Extinction**..... Product does not burn. Where fire is involved, use any fire fighting agent appropriate for surrounding material; use water spray to cool fire-exposed surfaces.

- Flash Point**..... Not applicable



Auto-ignition Temperature..... Not applicable

Upper Flammable Limit Not applicable

Lower Flammable Limit..... Not applicable

Hazardous Combustible Products... Fumes of sodium oxide can be generated by thermal decomposition at high temperatures. Reactions of sodium hydroxide with water and some commonly encountered materials can generate sufficient heat to ignite nearby combustible materials.

Special Fire Fighting Procedures..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Explosion Hazards..... Not available

Section 06 - Accidental Release Measures

Leak / Spill..... Wear appropriate personal protective equipment. Restrict access to area. Stop or reduce leak if safe to do so. Prevent material from entering sewers and waterways. Contain spill or leak by diking with inert material such as sand or earth. Small spills can be recovered or carefully diluted with water and neutralized, preferably with acetic acid. For large spills contact appropriate regulatory authorities.

Deactivating Materials..... Small spills can be diluted and cautiously neutralized, preferably with acetic acid. Diluted hydrochloric acid can also be used to neutralize small spills.

Section 07 - Handling and Storage

Handling Procedures..... Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.

Storage Requirements..... Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials such as strong acids, nitroaromatic, nitroparaffinic, organohalogen compounds and metals such as aluminum, zinc and tin.

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**..... NIOSH-approved respirator for dust and mist should be worn, if needed (ie: when pouring large quantities through the air without local exhaust).
- 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 proximity.

Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Odourless, clear to slightly turbid, viscous liquid
- Odor Threshold**..... Not applicable
- Specific Gravity (Water=1)**..... 1.52 (50%)
- Vapor Pressure (mm Hg, 20C)**..... 1.5mm Hg at 25°C
- Vapor Density (Air=1)**..... Not available
- Evaporation Rate**..... Not available
- Boiling Point**..... 140°C (50%)



Freeze/Melting Point..... approx. 12°C (50%)

pH..... 14

Water/Oil Distribution Coefficient.... Not available

Bulk Density..... Not available

% Volatiles by Volume..... Not available

Solubility in Water..... Completely miscible

Molecular Formula..... NaOH

Molecular Weight..... 40.00

Section 10 - Stability and Reactivity

Stability..... Stable under normal conditions.

Incompatibility..... Incompatible with strong acids, ammonia, tin, aluminum, zinc, organohalogen compounds, nitro and chloro organic compounds, flammable liquids, nitromethane, waxy solids, methanol and nitrous compounds.

Hazardous Products of Decomposition.. Sodium hydroxide can react with metals, such as aluminum, tin and zinc, to form flammable hydrogen gas.

Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Corrosive, severe irritant.

Sensitization..... Not available

Chronic/Acute Effects..... There have been no documented effects due to long-term exposure to sodium hydroxide.

Synergistic Materials..... Not available

Animal Toxicity Data..... LD₅₀(Intraperitoneal, Mice): 40mg/kg (50%)

Carcinogenicity..... Not considered to be carcinogenic by ACGIH and IARC.

Reproductive Toxicity..... Not available



Teratogenicity..... Not available

Mutagenicity..... Not available

Section 12 - Ecological Information

Fish Toxicity..... Not available

Biodegradability..... Not biodegradable

Environmental Effects..... Toxic to aquatic life through an immediate raise in pH to toxic levels.

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 - Transport Information

TDG Classification

Class..... 8

Group..... II

PIN Number..... UN1824

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment and ensure all caps, valves, or closures are secured in the closed position.

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 corrosion and scale control and pH adjustment at a maximum dosage for the following:

- sodium hydroxide 10%: 500mg/L
- sodium hydroxide 11%: 454mg/L
- sodium hydroxide 12%: 432mg/L



sodium hydroxide 13%: 399mg/L
sodium hydroxide 14%: 366mg/L
sodium hydroxide 15%: 333mg/L
sodium hydroxide 16%: 318mg/L
sodium hydroxide 17%: 301mg/L
sodium hydroxide 18%: 284mg/L
sodium hydroxide 19%: 267mg/L
sodium hydroxide 20%: 250mg/L
sodium hydroxide 21%: 240mg/L
sodium hydroxide 22%: 230mg/L
sodium hydroxide 23%: 220mg/L
sodium hydroxide 24%: 210mg/L
sodium hydroxide 25%: 200mg/L
sodium hydroxide 26%: 195mg/L
sodium hydroxide 27%: 188mg/L
sodium hydroxide 28%: 181mg/L
sodium hydroxide 29%: 174mg/L
sodium hydroxide 30%: 167mg/L
sodium hydroxide 31%: 163mg/L
sodium hydroxide 32%: 158mg/L
sodium hydroxide 33%: 153mg/L
sodium hydroxide 34%: 148mg/L
sodium hydroxide 35%: 143mg/L
sodium hydroxide 36%: 141mg/L
sodium hydroxide 37%: 137mg/L
sodium hydroxide 38%: 133mg/L
sodium hydroxide 39%: 129mg/L
sodium hydroxide 40%: 125mg/L
sodium hydroxide 41%: 123mg/L
sodium hydroxide 42%: 120mg/L
sodium hydroxide 43%: 117mg/L
sodium hydroxide 44%: 114mg/L
sodium hydroxide 45%: 111mg/L
sodium hydroxide 46%: 108mg/L
sodium hydroxide 47%: 106mg/L
sodium hydroxide 48%: 104mg/L
sodium hydroxide 49%: 102mg/L
sodium hydroxide 50%: 100mg/L

Section 16 - Other Information

Note: The responsibility 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, and assume no liability for damages incurred by the use of this material. It is the responsibility 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 its 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: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7

Phone: 306-664-2522

Fax: 306-665-6216

www.ClearTech.ca

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	12020 - 142 nd Street	T5L 2G8	780-452-6000	780-452-4600
Saskatoon, SK.	19 Peters Ave, North Corman Park	S7K 1V7	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

24 Hour Emergency Number - All Locations - 306-664-2522

MATERIAL SAFETY DATA SHEET**Sodium Thiosulphate****Section 01 - Chemical And Product And Company Information**

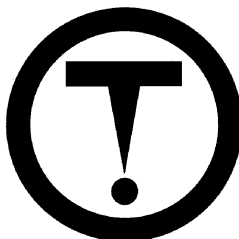
Product Identifier Sodium Thiosulphate

Product Use Bleaching agent, an ingredient in photographic fixer solutions, for extraction of silver from ores, as a mordant in dyeing and printing textiles, reducers in chrome dyeing, in leather manufacture and a reagent in analytical and organic chemistry. Antidote for cyanide poisoning.

Supplier Name..... ClearTech Industries Inc.
1500 Quebec Avenue
Saskatoon, SK. Canada
S7K 1V3

Prepared By..... ClearTech Industries Inc. Technical Department
Phone: 1 (800) 387-7503

24-Hour Emergency Phone..... 1 (800) 387-7503

**Section 02 - Composition / Information on Ingredients**

Hazardous Ingredients..... Sodium Thiosulphate >98%

CAS Number..... Sodium Thiosulphate 7772-98-7

Synonym (s)..... Sodium thiosulphate anhydrous, sodium hyposulphite, sodium thiosulphate crystal, thiosulphuric acid disodium salt, and disodium thiosulphate.



Section 03 - Hazard Identification

- Inhalation**..... Breathing product dust or mist may irritate respiratory tract.
- Skin Contact / Absorption**..... Dust or mist may cause irritation from prolonged contact. Aqueous solutions may cause irritations from repeated or prolonged contact.
- Eye Contact**..... Dust, solutions, or mist may irritate or burn the eyes and cause temporary conjunctivitis.
- Ingestion**..... Relatively low in acute toxicity but may cause irritation of the gastrointestinal tract and purging if large quantity is ingested.
- Exposure Limits**..... No OSHA/TWA or ACGIH/TLV established for sodium thiosulphate.
- OSHA/TWA: 5ppm (SO₂)
ACGIH/TLV: 2ppm (SO₂)
ACGIH/STEL: 5ppm (SO₂)

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 medical attention if difficulties persist.
- 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 medical attention if irritation persists.
- Ingestion**..... If swallowed do not induce vomiting. If vomiting occurs, lean patient forward or place on left side with head down to maintain open airway and prevent aspiration. Do not give water to patient becoming unconscious. If conscious then rinse out mouth with water and slowly drink water.
- Additional Information**..... Physician to treat symptomatically.

Section 05 - Fire Fighting

- Conditions of Flammability**..... Non-flammable. Heating above 100°C yields flammable residue, sodium sulphide.
- Means of Extinction**..... Product does not burn. Where fire is involved, use any fire fighting agent appropriate for surrounding material; use water spray to cool fire-exposed surfaces.
- Flash Point**..... Not Applicable
- Auto-ignition Temperature**..... Not Applicable
- Upper Flammable Limit** Not Applicable
- Lower Flammable Limit**..... Not Applicable
- Hazardous Combustible Products**... If involved in a fire, toxic and irritating gases (sulphur dioxide gas: toxic, corrosive, and an oxidizer) and residue (flammable sodium sulphide residue) may evolve.
- Special Fire Fighting Procedures**..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.
- Explosion Hazards**..... Not Available

Section 06 - Accidental Release Measures

- Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers. Cautiously spray residue with plenty of water.
- Deactivating Materials**..... Not Available

Section 07 - Handling and Storage

- Handling Procedures**..... Use proper equipment for lifting and transporting all containers. Use sensible industrial hygiene and housekeeping practices. Wash thoroughly after handling. Avoid all situations that could lead to harmful exposure.
- Storage Requirements**..... Store in cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials.

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**..... If use creates dust formations, then a NIOSH-approved respirator with a dust cartridge is recommended. If sulphur dioxide is evolved, a self-contained breathing apparatus should be used
- Gloves**..... Impervious gloves of chemically resistant material (neoprene, rubber, PVC) should be worn. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... No special footwear is required other than what is mandated at place of work.

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 proximity.

Section 09 - Physical and Chemical Properties

- Physical State**..... Solid
- Odor and Appearance**..... No odor; clear to white granules or crystals.
- Odor Threshold**..... Not Applicable
- Specific Gravity (Water=1)**..... 1.667
- Vapor Pressure (mm Hg, 20C)**..... Not Applicable
- Vapor Density (Air=1)**..... Not Applicable
- Evaporation Rate**..... Not Applicable
- Boiling Point**..... Decomposes at temperatures >100°C



Freeze/Melting Point..... Approximately 48°C
pH..... 7.8
Water/Oil Distribution Coefficient.... Not Applicable
Bulk Density..... Not Available
% Volatiles by Volume..... Not Applicable
Solubility in Water..... 33% at 0°C, soluble in water
Molecular Formula..... Na₂S₂O₃
Molecular Weight..... 158.11

Section 10 - Stability and Reactivity

Stability..... Stable under normal conditions. Avoid temperatures 100°C or greater.
Incompatibility..... Incompatible with strong oxidizers, acids and water reactive materials.
Hazardous Products of Decomposition.. Oxides of sulphur and hydrogen sulphide
Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Irritant to skin and eye after repeated or prolonged contact.
Sensitization..... Not Available
Chronic/Acute Effects..... No unusual toxicity reported
Synergistic Materials..... Not Available
Animal Toxicity Data..... LD₅₀(oral, rat): >5000 mg/kg
Carcinogenicity..... Not known to be a carcinogenic.
Reproductive Toxicity..... Not Available



Teratogenicity..... Not Available

Mutagenicity..... Not Available

Section 12 - Ecological Information

Fish Toxicity..... Not Available

Biodegradability..... Not Available

Environmental Effects..... May be harmful to aquatic organisms.

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

TDG Classification

Class..... Not Regulated

Group..... Not Regulated

PIN Number..... Not Regulated

Other..... Secure containers (full and/or empty) with suitable hold down devices during shipment.

Section 15 - Regulatory Information

WHMIS Classification.....D2

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.



Section 16 - Other Information

Preparation Date..... March 23, 2011

Revision Date..... January 31, 2014
March 18, 2014

Note: The responsibility 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, and assume no liability for damages incurred by the use of this material. It is the responsibility 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 its 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: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V3
Phone: 306-664-2522
Fax: 306-665-6216

www.ClearTech.ca

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1 (800) 387-7503	1 (888) 281-8109
Port Coquitlam, B.C.	2023 Kingsway Ave	V3C 1S9	1 (800) 387-7503	1 (888) 281-8109
Calgary, AB.	5516E - 40 th St. S.E.	T2C 2A1	1 (800) 387-7503	1 (888) 281-8109
Edmonton, AB.	11750 - 180 th Street	T5S 1N7	1 (800) 387-7503	1 (888) 281-8109
Saskatoon, SK.	1500 Quebec Avenue	S7K 1V3	1 (800) 387-7503	1 (888) 281-8109
Regina, SK..	555 Henderson Drive	S42 5X2	1 (800) 387-7503	1 (888) 281-8109
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1 (800) 387-7503	1 (888) 281-8109
Mississauga, ON.	7480 Bath Road	L4T 1L2	1 (800) 387-7503	1 (888) 281-8109

24 Hour Emergency Number - All Locations – 1 (800) 387-7503



Material Safety Data Sheet

LA10924
HYDROFLUOSILICIC ACID 23%

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA10924
Product Name: HYDROFLUOSILICIC ACID 23%
Synonyms: Fluosilicic Acid, Hexafluosilicic Acid
Chemical Family: Inorganic acid.
Application: Water treatment.

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

Prepared By: The Environment, Health and Safety Department of Univar Canada Ltd.
Preparation date of MSDS: 10/Dec/2012
Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
Fluorosilicic Acid 16961-83-4	23-25	Inhalation LC50 (Rat) 1.11 mg/L Oral LD50 (Rat) 125 mg/kg Oral LD50 (Rat) 430 mg/kg
Hydrogen Fluoride 7664-39-3	<=1	Inhalation LC50 Rat = 1276 ppm 1 h Inhalation LC50 Rat = 850 mg/m ³ 1 h

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:

Eye Contact: Corrosive. Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, with marked excess redness and swelling of the conjunctiva. May cause permanent eye damage.

Skin Contact: Corrosive. Causes severe skin irritation. Painful irritation, delayed appearance. Causes severe burns. Risk of shock. If touched using the fingernails, causes severe pain after several hours. Risk of hypocalcaemia following the extent of the lesions.

Inhalation: Corrosive. Causes severe respiratory irritation. At high concentrations risk of hypocalcaemia with nervous problems (tetany) and cardiac arrhythmia. In case of repeated or prolonged exposure: risk of sore throat, nose bleeds, chronic bronchitis.

3. HAZARDS IDENTIFICATION

Ingestion: Corrosive. Can cause severe irritation to the lungs, nose and throat if swallowed. Severe irritation of the mouth, throat and stomach. Perforation of the esophagus and stomach lining may occur. May cause same effects as detailed under inhalation. Aspiration into the lungs during ingestion or vomiting may lead to chemical pneumonitis.

4. FIRST AID MEASURES

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

Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

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

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

Notes to Physician: Treatment based on sound judgment of physician and individual reactions of patient. Exposed person should be observed for 24 - 48 hours for delayed onset of pulmonary edema.

5. FIRE FIGHTING MEASURES

Flash Point: None.

Flash Point Method: Not applicable.

Autoignition Temperature: Not available.

Flammable Limits in Air (%): Not Available.

Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Special Exposure Hazards: Reacts with metals to generate flammable hydrogen gas. Keep container cool with water, using fog nozzles, as decomposition will occur above 222 °F and produce toxic and corrosive fumes of fluoride.

Hazardous Decomposition/Combustion Materials (under fire conditions): Toxic fumes. Corrosive fumes. Hydrogen fluoride. Silicon tetrafluoride. Hydrogen.

Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.

NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 3, FLAMMABILITY 0, INSTABILITY 0

HMIS RATINGS FOR THIS PRODUCT ARE: HEALTH 3, FLAMMABILITY 0, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.

Environmental Precautionary Measures: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Consult local authorities.

Procedure for Clean Up: Isolate hazard area and restrict access. Ventilate area. Dike area to prevent spill from spreading. Neutralize with lime slurry, limestone, or soda ash. Absorb with an inert dry material and place in an appropriate waste disposal container.

7. HANDLING AND STORAGE

Handling: Corrosive. For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Do not pressurize or expose empty containers to open flame, sparks, or heat. Use non-sparking tools. When diluting, add this product to water in small amounts to avoid spattering. Never add water to this material.

Storage: Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep away from direct sunlight. Keep containers tightly closed. Store in accordance with good industrial practices. Do not store in glass or stoneware. Tanks must be diked. Place away from incompatible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Use process enclosure, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

Respiratory Protection: A NIOSH approved cartridge respirator with full-face shield. Chemical cartridge should provide protection against acid fumes (Hydrogen Fluoride). For concentrations greater than 20 ppm, a NIOSH approved self-contained breathing apparatus with full-face shield should be used.

Gloves:

Appropriate chemical resistant gloves should be worn.

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

Eyes: Chemical goggles; also wear a face shield if splashing hazard exists. Do NOT wear contact lenses.

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

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Fluorosilicic Acid	Not available.	Not available.	Not Available.
Hydrogen Fluoride	0.5 ppm TLV-TWA 2 ppm Ceiling F	3 ppm TWA F 6 ppm STEL F	30 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.

Color: Colorless

Odor: Pungent

pH 1 (1% solution)

Specific Gravity: 1.32

Boiling Point: 227.3°C /226°F

Freezing/Melting Point: <-30°C / <-22°F

Vapor Pressure: 22.5 mmHg @ 68°F

Vapor Density: >1

% Volatile by Volume: Not Available.

Evaporation Rate: Not Available.

Solubility: Completely miscible.

VOCs: Not Available.

Viscosity: Not Available.

Molecular Weight: Not Available.

Other: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: To avoid thermal decomposition do not overheat. Temperatures over 108 °C. Do not allow water to get into container because of violent reaction.

Materials to Avoid: Strong acids. Oxidizing agents. Combustible materials. Peroxides. Organic peroxides. Metals. Glass. Stoneware.

Hazardous Decomposition Products: Toxic fumes when heated to decomposition. Hydrogen fluoride. Silicone Tetra-fluoride. Hydrogen gas.

Additional Information:

When diluting, add acid to water. DO NOT add water to the acid.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

11. TOXICOLOGICAL INFORMATION

Ingestion: Corrosive. Can cause severe irritation to the lungs, nose and throat if swallowed. Severe irritation of the mouth, throat and stomach. Perforation of the esophagus and stomach lining may occur. May cause same effects as detailed under inhalation. Aspiration into the lungs during ingestion or vomiting may lead to chemical pneumonitis.

Skin Contact: Corrosive. Causes severe skin irritation. Painful irritation, delayed appearance. Causes severe burns. Risk of shock. If touched using the fingernails, causes severe pain after several hours. Risk of hypocalcaemia following the extent of the lesions.

Inhalation: Corrosive. Causes severe respiratory irritation. At high concentrations risk of hypocalcaemia with nervous problems (tetany) and cardiac arrhythmia. In case of repeated or prolonged exposure: risk of sore throat, nose bleeds, chronic bronchitis.

Eye Contact: Corrosive. Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, with marked excess redness and swelling of the conjunctiva. May cause permanent eye damage.

Additional Information: Prolonged exposure could result in bone changes, corrosive effect on mucous membranes including ulceration of nose, throat and bronchial tubes, cough, shock, pulmonary edema, Fluorosis, coma and death. Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Pre-existing eye and skin disorders may be aggravated by exposure to this product.

Acute Test of Product:

Acute Oral LD50: Not Available.

Acute Dermal LD50: Not Available.

Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Fluorosilicic Acid	Group 3	Not listed.
Hydrogen Fluoride	Not listed.	Not listed.

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Not Available.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Fluorosilicic Acid	28.7 mg/L LC50 (Pimephales promelas) 96 h static 65 mg/L LC50 (Poecilia reticulata) 96 h static	Not Available.	Not Available.
Hydrogen Fluoride	660 mg/L LC50 (Leuciscus idus) 48 h	Not Available.	Not Available.

Other Information:

No additional remark.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.

Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):

DOT Shipping Name: FLUOROSILICIC ACID

DOT Hazardous Class 8

14. TRANSPORT INFORMATION

DOT UN Number: UN1778

DOT Packing Group: II

DOT Reportable Quantity (lbs): 100 (Hydrogen fluoride)

Note: No additional remark.

Marine Pollutant: No.

TDG (Canada):

TDG Shipping Name: FLUOROSILICIC ACID

Hazard Class: 8

UN Number: UN1778

Packing Group: II

Note: No additional remark.

Marine Pollutant: No.

15. REGULATORY INFORMATION

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

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

Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Fluorosilicic Acid	Not Listed.	Not Listed.	Not Listed.
Hydrogen Fluoride	Listed	Listed	Listed

California Proposition 65: Not Listed.

MA Right to Know List: Listed.

New Jersey Right-to-Know List: Listed.

Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:

D1B TOXIC MATERIALS

E CORROSIVE MATERIAL



16. OTHER INFORMATION

Additional Information:

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

Disclaimer:

NOTICE TO READER:

Univar, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

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

1. Product and Company Identification

Product identifier	Hydrex 3223
Version #	02
Issue date	07-14-2013
Revision date	03-09-2015
Supersedes date	07-14-2013
CAS #	Mixture
Product use	Potable Water Coagulant
Manufacturer information	
Supplier	Veolia Water Technologies Canada Inc.
Address	2000 Argentia Road, Plaza IV, Suite 430 Mississauga, ON L5N 1W1 Canada
Contact Person	Hydrex Product Specialist
Telephone	(905) 286-4846
Fax	(905) 286-0488
e-mail	vwtcanada_hydrex@veolia.com
24-Hour Emergency telephone	+1-760-476-3962 (Code:333239)
Supplier	Not available.

2. Hazards Identification

Emergency overview	DANGER Toxic if inhaled. Corrosive. Causes skin and eye burns. Irritating to eyes, respiratory system and skin.
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Causes chemical burns. Corrosive to the eyes and may cause severe damage including blindness. Causes eye burns. Risk of serious damage to eyes. Do not get this material in contact with eyes.
Skin	Causes chemical burns. Causes skin burns. Irritating to skin. Do not get this material in contact with skin. Avoid contact with the skin.
Inhalation	Causes burns. Irritating to respiratory system. Prolonged inhalation may be harmful. Do not breathe dust/fume/gas/mist/vapors/spray.
Ingestion	Harmful if swallowed. Harmful if swallowed. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion causes burns of the upper digestive and respiratory tracts. Do not ingest.
Chronic effects	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Signs and symptoms	Contact with this material will cause burns to the skin, eyes and mucous membranes.
Potential environmental effects	May cause long-term adverse effects in the environment. Not expected to be harmful to aquatic organisms.

3. Composition / Information on Ingredients

Non-hazardous components	CAS #	Percent
ALUMINUM, WATER SOLUBLE SALTS, N.O.S.	39290-78-3	15 - 40
Other components below reportable levels		60 - 100
Composition comments	The full text for all R-phrases is displayed in Section 16 of the MSDS.	

4. First Aid Measures

First aid procedures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately.

Skin contact

Remove and isolate contaminated clothing and shoes. Immediately flush skin with plenty of water. Get medical attention immediately. For minor skin contact, avoid spreading material on unaffected skin. Wash clothing separately before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Continue rinsing. Get medical attention immediately.

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth thoroughly. Never give anything by mouth to a victim who is unconscious or is having convulsions. 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. 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.

Notes to physician

Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General advice

In case of shortness of breath, give oxygen. Immediate medical attention is required. 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. Keep victim warm. Do not use mouth-to-mouth method if victim ingested the substance.

5. Fire Fighting Measures

Flammable properties

Not flammable by WHMIS criteria. The product is not flammable. No unusual fire or explosion hazards noted. None known.

Extinguishing media

Suitable extinguishing media

Foam. Dry chemical powder. Carbon dioxide (CO₂). Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media

Not available.

Protection of firefighters

Protective equipment for firefighters

Wear suitable protective equipment.

Fire fighting equipment/instructions

Move containers from fire area if you can do so without risk.

Explosion data

Sensitivity to static discharge

Not available.

Sensitivity to mechanical impact

Not available.

Hazardous combustion products

Not available.

General fire hazards

No unusual fire or explosion hazards noted. This product is not flammable.

6. Accidental Release Measures

Personal precautions

Immediately evacuate personnel to safe areas. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate personal protective equipment. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. 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 MSDS.

Environmental precautions

Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

Methods for containment

Stop leak if you can do so without risk. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up

Ventilate the contaminated area. Wear appropriate protective equipment and clothing during clean-up. Should not be released into the environment. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Never return spills to original containers for re-use. Clean up in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. For waste disposal, see section 13 of the MSDS.

Other information

Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling

Do not breathe dust/fume/gas/mist/vapors/spray. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid prolonged exposure. Do not get this material on clothing. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Use care in handling/storage. Handle an open container with care.

Storage

CAUTION Store locked up. Store in a cool, dry place out of direct sunlight. Store in a closed container away from incompatible materials. Store in a well-ventilated place. Keep out of the reach of children. Store away from incompatible materials (see Section 10 of the MSDS). Store in accordance with local/regional/national/international regulation.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	1 mg/m3	Respirable fraction.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	2 mg/m3

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	1 mg/m3	Respirable.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	1 mg/m3	Respirable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	1 mg/m3	Respirable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	TWA	2 mg/m3

Biological limit values

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

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. General ventilation normally adequate. Provide adequate general and local exhaust ventilation.
Personal protective equipment	
Eye/face protection	Wear safety glasses with side shields (or goggles) and a face shield. Chemical goggles and face shield are recommended. Do not get in eyes. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
Skin protection	Do not get this material in contact with skin. Do not get this material on clothing. Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent). Chemical resistant gloves. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations.
Respiratory protection	Do not breathe dust/fume/gas/mist/vapors/spray. In case of insufficient ventilation, wear suitable respiratory equipment.
Hand protection	Chemical resistant gloves.

9. Physical & Chemical Properties

Appearance	Clear
Physical state	Liquid.
Form	Liquid.
Color	Colorless or Amber
Odor	Not available.
pH	2.1 - 3.1
Vapor pressure	17 mm Hg 0 hPa estimated
Vapor density	1.3
Boiling point	Not available.
Melting point/Freezing point	10.4 °F (-12 °C)
Solubility (water)	Not available.
Specific gravity	1.18 - 1.28
Flash point	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Contact with incompatible materials. None under normal conditions.
Incompatible materials	Not available.
Hazardous decomposition products	Not available.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	Species	Test Results
Hydrex 3223		
Acute		
<i>Dermal</i>		
LD50	Rat	6250 mg/kg estimated

Product	Species	Test Results
<i>Inhalation</i> LC50	Rat	15.625 mg/l, 4 hours estimated
<i>Oral</i> LD50	Rat	> 5000 mg/kg
Acute effects	Toxic by inhalation. Causes burns.	
Sensitization	Not classified.	
Local effects	Irritating to respiratory system and skin. Irritating to eyes.	
Chronic effects	Prolonged inhalation may be harmful. Not expected to be hazardous by WHMIS criteria.	
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA. Not classifiable as to carcinogenicity to humans.	
ACGIH Carcinogens		
ALUMINUM, WATER SOLUBLE SALTS, N.O.S. (CAS 39290-78-3)	A4	Not classifiable as a human carcinogen.
Skin corrosion/irritation	Hazardous by OSHA criteria. Corrosive effects. Irritating to skin.	
Serious eye damage/irritation	Irritating to eyes.	
Mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. Due to lack of data the classification is not possible.	
Reproductive effects	Due to lack of data the classification is not possible.	
Teratogenicity	Not available.	
Epidemiology	No epidemiological data is available for this product.	
Synergistic materials	Not available.	
Further information	This product has no known adverse effect on human health.	

12. Ecological Information

Ecotoxicological data

Product	Species	Test Results
Hydrex 3223		
Aquatic		
Crustacea	EC50	Daphnia 271.875 mg/l, 48 hours estimated
Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>) 1074 ppm, 96 hr Calculated Rainbow Trout 1768 ppm, 96 hr Calculated
<i>Acute</i> Crustacea	EC50	Daphnia 271.875 mg/l, 48 hours Calculated
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.	
Aquatic toxicity	Not classified.	
Persistence and degradability	No data is available on the degradability of this product.	

13. Disposal Considerations

Disposal instructions	Contract with a disposal operator licensed by the Law on Disposal and Cleaning. This material and its container must be disposed of as hazardous waste. Incinerate the material under controlled conditions in an approved incinerator. Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities. Do not discharge into drains, water courses or onto the ground. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container (in accordance with related regulations). When your own wastewater treatment plant is not available, collect entire waste and then charge to a licensed industrial waste management professional with manifests for industrial waste.
------------------------------	---

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Not applicable.

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

TDG

UN number UN3264
UN proper shipping name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group III
Environmental hazards Marine pollutant only when containing 10% or more substances identified as marine pollutants or severe marine pollutant when containing 1% or more substances identified as severe marine pollutants
Special precautions for user Read safety instructions, MSDS and emergency procedures before handling.

IATA

UN number UN3264
UN proper shipping name Corrosive liquid, acidic, inorganic, n.o.s.
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group III
Environmental hazards No.
ERG Code 8L
Special precautions for user Read safety instructions, MSDS and emergency procedures before handling.
Other information
Passenger and cargo aircraft Allowed.
Cargo aircraft only Allowed.

IMDG

UN number UN3264
UN proper shipping name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group III
Environmental hazards
Marine pollutant No.
EmS F-A, S-B
Special precautions for user Read safety instructions, MSDS and emergency procedures before handling.

IATA; IMDG; TDG



15. Regulatory Information

Canadian regulations

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

WHMIS status

Controlled

WHMIS classification

E - Corrosive

WHMIS labeling



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)	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	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

Recommended restrictions

PROFESSIONAL USE ONLY

Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 1
Flammability: 0
Physical hazard: 0
Personal protection: C

NFPA ratings

Health: 1
Flammability: 0
Instability: 0
Special hazards: COR

Disclaimer

Veolia Water Technologies is not able to anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use and or non respect of Veolia Water Technologies' requirement.

Prepared by

Not available.

This data sheet contains changes from the previous version in section(s):

Product and Company Identification: Product Review
Hazards Identification: Ingestion
Composition / Information on Ingredients: Disclosure Overrides
Accidental Release Measures: Personal precautions
Accidental Release Measures: Methods for cleaning up
Exposure Controls / Personal Protection: PPE Symbols
Physical & Chemical Properties: Multiple Properties
Chemical Stability & Reactivity Information: Conditions to avoid
Ecological Information: Ecotoxicity
Other Information: Disclaimer
Other Information: Recommended restrictions

1. Product and Company Identification

Product identifier	Hydrex 3551
Version #	01
Issue date	11-07-2014
CAS #	Mixture
Product use	Potable Water Flocculant
Manufacturer	
Supplier	VWS Canada
Address	2000 Argentia Road, Plaza IV, Suite 430 Mississauga, ON L5N 1W1 Canada
Contact Person	Hydrex Product Specialist
Telephone	(905) 286-4846
Fax	(905) 286-0488
e-mail	vwscanada.hydrex@veoliawater.com
24-Hour Emergency telephone	+1-760-476-3962 (Code:333239)

2. Hazards Identification

Potential health effects

Eyes	Health injuries are not known or expected under normal use.
Skin	Health injuries are not known or expected under normal use.
Inhalation	Health injuries are not known or expected under normal use.
Ingestion	Health injuries are not known or expected under normal use.

3. Composition / Information on Ingredients

The components are not hazardous or are below required disclosure limits.

4. First Aid Measures

First aid procedures

Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Skin contact	Rinse skin with water/shower. Get medical attention if irritation develops and persists.
Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
General advice	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties	Not flammable by WHMIS criteria. Dust accumulation from this product may present an explosion hazard in the presence of an ignition source.
Extinguishing media	
Suitable extinguishing media	Water spray, fog, CO ₂ , dry chemical, or alcohol resistant foam.
Protection of firefighters	
Protective equipment for firefighters	In the event of fire, wear self-contained breathing apparatus.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. Dust may form an explosive mixture in the atmosphere.
Specific methods	Use water spray to cool unopened containers.

Explosion data	
Sensitivity to static discharge	Not available.
Sensitivity to mechanical impact	Not available.

6. Accidental Release Measures

Personal precautions	Slippery when wet.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not contaminate water.
Methods for cleaning up	Should not be released into the environment. Following product recovery, flush area with water. For waste disposal, see section 13 of the MSDS.

7. Handling and Storage

Handling	Avoid release to the environment. Material can be slippery when wet.
Storage	Store in a dry area. Store in closed original container at temperatures between 5°C and 30°C.

8. Exposure Controls / Personal Protection

Biological limit values	No biological exposure limits noted for the ingredient(s).
Personal protective equipment	
Skin protection	Normal work clothing (long sleeved shirts and long pants) is recommended.
Respiratory protection	No personal respiratory protective equipment normally required.

9. Physical & Chemical Properties

Appearance	Not available.
Physical state	Liquid.
Form	Not available.
Color	Off-white.
Odor	Not available.
pH	Not available.
Vapor pressure	0 hPa estimated
Vapor density	Not available.
Boiling point	Not available.
Melting point/Freezing point	Not available.
Solubility (water)	Not available.
Specific gravity	0.75 - 0.95
Flash point	Not available.
Auto-ignition temperature	Not available.
Viscosity	2700 - 6000 cP (25 °C)
Ph Of 1% Solution	5 - 7

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	None under normal conditions.
Incompatible materials	Not available.
Hazardous decomposition products	Upon decomposition, this product may yield oxides of nitrogen and ammonia, carbon dioxide, carbon monoxide and other low molecular weight hydrocarbons.

11. Toxicological Information

Toxicological data

Product	Species	Test Results
Hydrex 3551 (CAS Mixture)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 10000 mg/kg

Product	Species	Test Results
Oral LD50	Rat	> 5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Chronic effects Not expected to be hazardous by WHMIS criteria.

12. Ecological Information

Ecotoxicological data

Product	Species	Test Results
Hydrex 3551 (CAS Mixture)		
Algae	IC50	Algae 2276 mg/l, 72 hr
Crustacea	EC50	Daphnia > 100 mg/l, 48 hr
Other	LC50	Rainbow Trout 130 mg/l, 96 hr
Aquatic		
Fish	LC50	Zebra danio (Danio rerio) > 100 mg/l, 96 hr

* 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 Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Dispose in accordance with all applicable regulations.

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

14. Transport Information

TDG

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

15. Regulatory Information

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Non-controlled

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)	No
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

Country(s) or region	Inventory name	On inventory (yes/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

Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 0
Flammability: 1
Physical hazard: 0

NFPA ratings

Health: 0
Flammability: 1
Instability: 0

Disclaimer

Veolia Water Solutions & Technologies is not able to anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use and or non respect of Veolia Water Solutions & Technologies' requirement.

This data sheet contains changes from the previous version in section(s):

Product and Company Identification: Product Review
Physical & Chemical Properties: Multiple Properties

1. Product and Company Identification

Product identifier	Hydrex 9550
Version #	03
Issue date	07-15-2012
Revision date	03-22-2016
Supersedes date	08-25-2014
Product use	Water Treatment Chemical
Manufacturer information	
Supplier	Veolia Water Technologies Canada Inc.
Address	2000 Argentia Road, Plaza IV, Suite 430 Mississauga, ON L5N 1W1 Canada
Contact Person	Hydrex Product Specialist
Telephone	(905) 286-4846
Fax	(905) 286-0488
e-mail	vwcanada-hydrex@veolia.com
24-Hour Emergency telephone	+1-760-476-3962 (Code:333239)
Supplier	Not available.

2. Hazards Identification

Emergency overview	DANGER Corrosive. Causes skin and eye burns.
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Causes chemical burns. Corrosive to the eyes and may cause severe damage including blindness. Do not get this material in contact with eyes. Health injuries are not known or expected under normal use.
Skin	Causes chemical burns. Do not get this material in contact with skin. Health injuries are not known or expected under normal use.
Inhalation	May cause irritation of respiratory tract. Prolonged inhalation may be harmful. Do not breathe dust/fume/gas/mist/vapors/spray. Health injuries are not known or expected under normal use.
Ingestion	Harmful if swallowed. Ingestion causes burns of the upper digestive and respiratory tracts. Do not ingest. Health injuries are not known or expected under normal use.
Chronic effects	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Signs and symptoms	Contact with this material will cause burns to the skin, eyes and mucous membranes.
Potential environmental effects	Components of this product are hazardous to aquatic life. May cause long-term adverse effects in the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
SODIUM HYDROXIDE	1310-73-2	40 - 70
Other components below reportable levels		40 - 70

4. First Aid Measures

First aid procedures	
Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention, if needed.

Skin contact	Remove and isolate contaminated clothing and shoes. Immediately flush skin with plenty of water. Get medical attention immediately. For minor skin contact, avoid spreading material on unaffected skin. Wash clothing separately before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. If a contact lens is present, DO NOT delay irrigation or attempt to remove the lens. Continue rinsing. Get medical attention immediately.
Ingestion	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth thoroughly. Never give anything by mouth to a victim who is unconscious or is having convulsions. 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. 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.
Notes to physician	In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation.
General advice	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties	Not flammable by WHMIS criteria.
Extinguishing media	
Suitable extinguishing media	Not available.
Unsuitable extinguishing media	Not available.
Protection of firefighters	
Specific hazards arising from the chemical	Material can be slippery when wet.
Fire fighting equipment/instructions	Not available.
Explosion data	
Sensitivity to static discharge	Not available.
Sensitivity to mechanical impact	Not available.
Hazardous combustion products	Not available.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. For personal protection, see section 8 of the MSDS. Slippery when wet.
Environmental precautions	Do not contaminate water.
Methods for containment	Stop leak if you can do so 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: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. 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. Never return spills to original containers for re-use. Clean up in accordance with all applicable regulations. For waste disposal, see section 13 of the MSDS.

7. Handling and Storage

Handling	Avoid forming spray/aerosol mists. Material can be slippery when wet. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid prolonged exposure. Do not get this material on clothing. Do not use in areas without adequate ventilation. Wash thoroughly after handling. Avoid release to the environment. Use care in handling/storage.
-----------------	---

Storage

Store in a closed container away from incompatible materials. Store away from incompatible materials (see Section 10 of the MSDS).

8. Exposure Controls / Personal Protection**Occupational exposure limits****US. ACGIH Threshold Limit Values**

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	Ceiling	2 mg/m ³

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
SODIUM HYDROXIDE (CAS 1310-73-2)	PEL	2 mg/m ³

Biological limit values

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

Engineering controls

Ensure adequate ventilation, especially in confined areas.

Personal protective equipment**Eye/face protection**

Wear safety glasses with side shields (or goggles) and a face shield. Chemical goggles and face shield are recommended. Do not get in eyes.

Skin protection

Do not get this material in contact with skin. Wear suitable protective clothing. Chemical resistant gloves.

Respiratory protection

Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection. Avoid forming spray/aerosol mists.

Hand protection

Chemical resistant gloves.

9. Physical & Chemical Properties**Appearance**

Not available.

Physical state

Liquid.

Form	Liquid.
Color	Colorless
Odor	Odorless.
pH	13.7
Vapor pressure	6.33 mm Hg
Vapor density	Not available.
Boiling point	293 °F (145 °C)
Melting point/Freezing point	39.92 °F (4.4 °C)
Solubility (water)	Not available.
Specific gravity	1.53
Flash point	Non flammable aqueous solution
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.
Other data	
Density	1.53 g/cm ³

10. Chemical Stability & Reactivity Information

Reactivity	Reacts violently with strong acids. This product may react with oxidizing agents.
Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Do not mix with other chemicals. Contact with incompatible materials.
Incompatible materials	Strong acids. Acids. Oxidizing agents.
Hazardous decomposition products	Not available.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	Species	Test Results
Hydrex 9550		
Acute		
<i>Oral</i>		
LDL0	Rabbit	400 mg/kg
Components	Species	Test Results
SODIUM HYDROXIDE (CAS 1310-73-2)		
Acute		
<i>Oral</i>		
LD50	Rat	> 300 mg/l
LDL0	Rabbit	500 mg/kg
Acute effects	Causes burns.	
Sensitization	Not available.	
Local effects	May produce corrosive solutions on contact with water.	
Chronic effects	Not expected to be hazardous by WHMIS criteria. Prolonged inhalation may be harmful.	
Carcinogenicity	Not available.	
Skin corrosion/irritation	Corrosive effects.	
Serious eye damage/irritation	Not available.	
Mutagenicity	Not available.	
Reproductive effects	Not available.	

Material name: Hydrex 9550

3065 Version #: 03 Revision date: 03-22-2016 Issue date: 07-15-2012

MSDS Canada

Teratogenicity Not available.

Synergistic materials Not available.

12. Ecological Information

Ecotoxicological data

Product		Species	Test Results
Hydrex 9550			
	Aquatic		
	<i>Acute</i>		
	Algae	EC50	Algae > 75 mg/l, 72 hours Calculated
	Crustacea	EC50	Daphnia >= 60 mg/l, 48 hours Calculated
	Fish	LC50	Bluegill (Lepomis macrochirus) >= 90 mg/l, 48 hours Calculated
			Mosquitofish (Gambusia affinis affinis) 125 mg/l, 96 hours Calculated

Components		Species	Test Results
SODIUM HYDROXIDE (CAS 1310-73-2)			
	Aquatic		
	Crustacea	EC50	Water flea (Ceriodaphnia dubia) 34.59 - 47.13 mg/l, 48 hours
	Fish	LC50	Western mosquitofish (Gambusia affinis) 125 mg/l, 96 hours

Ecotoxicity Components of this product are hazardous to aquatic life.

Environmental effects Harmful to aquatic organisms. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Aquatic toxicity Not available.

Persistence and degradability Not available.

13. Disposal Considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies.

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

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

TDG

UN number	UN1824
UN proper shipping name	SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	Not available.
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

IATA

UN number	UN1824
UN proper shipping name	Sodium hydroxide solution
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	8L
Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

Other information

Passenger and cargo aircraft Allowed.
Cargo aircraft only Allowed.

IMDG

UN number UN1824
UN proper shipping name SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)
Class 8
Subsidiary risk -
Packing group II
Environmental hazards
Marine pollutant No.
EmS F-A, S-B
Special precautions for user Read safety instructions, MSDS and emergency procedures before handling.

IATA; IMDG; TDG



15. Regulatory Information

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Controlled

WHMIS classification D2B - Other Toxic Effects-TOXIC
E - Corrosive

WHMIS labeling



International Inventories

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

1. Identification

Product identifier	VEOLIA ACTISAND		
Other means of identification	None.		
Recommended use	Wastewater Treatment		
Recommended restrictions	Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations. PROFESSIONAL USE ONLY		
Manufacturer/Importer/Supplier/Distributor information			
Manufacturer			
Supplier	Veolia Water Technologies Canada Inc.		
Address	2000 Argentia Road, Plaza IV, Suite 430 Mississauga, ON L5N 1W1 Canada		
Contact Person	Hydrex Product Specialist		
Telephone	(905) 286-4846		
Fax	(905) 286-0488		
e-mail	vwtcanada-hydrex@veolia.com		
24-Hour Emergency telephone	+1-760-476-3962 (Code:333239)		
Supplier	Not available.		

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Carcinogenicity	Category 1A
Environmental hazards	Not classified.	

Label elements



Signal word	Danger		
Hazard statement	May cause cancer.		
Precautionary statement			
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.		
Response	IF exposed or concerned: Get medical advice/attention.		
Storage	Not available.		
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.		
Other hazards	None known.		
Supplemental information	None.		

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Crystalline silica		14808-60-7	100

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

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Coughing.
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	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Not available.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. 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	The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

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. Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Do not breathe dust. Avoid prolonged exposure. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Protect from sunlight. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in cool, dry place.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Material	Type	Value	Form
VEOLIA ACTISAND	TWA	0.025 mg/m ³	Respirable fraction.
Components	Type	Value	Form
Crystalline silica (CAS 14808-60-7)	TWA	0.025 mg/m ³	Respirable fraction.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Material	Type	Value	Form
VEOLIA ACTISAND Components	TWA Type	0.025 mg/m3 Value	Respirable particles. Form
Crystalline silica (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable particles.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Material	Type	Value	Form
VEOLIA ACTISAND Components	TWA Type	0.025 mg/m3 Value	Respirable fraction. Form
Crystalline silica (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Crystalline silica (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Material	Type	Value	Form
VEOLIA ACTISAND Components	TWA Type	0.1 mg/m3 Value	Respirable. Form
Crystalline silica (CAS 14808-60-7)	TWA	0.1 mg/m3	Respirable.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Material	Type	Value	Form
VEOLIA ACTISAND Components	TWA Type	0.1 mg/m3 Value	Respirable dust. Form
Crystalline silica (CAS 14808-60-7)	TWA	0.1 mg/m3	Respirable dust.

Biological limit values

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

Exposure guidelines

Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

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**

Chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other

Use of an impervious apron is recommended. Chemical resistant gloves.

Respiratory protection

Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.

Thermal hazards

Not available.

General hygiene considerations

Observe any medical surveillance requirements. 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**

Solid.

Form

Solid.

Color

Not available.

Material name: VEOLIA ACTISAND

2725 Version #: 01 Issue date: 08-16-2016

SDS Canada

Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
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.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 0.0000001 kPa at 25 °C
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Heat of combustion (NFPA 30B)	0 kJ/g
Molecular formula	O2Si
Oxidizing properties	Not oxidizing.

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	Contact with incompatible materials.
Incompatible materials	Powerful oxidizers. Chlorine.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Coughing.
Information on toxicological effects	
Acute toxicity	Not available.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
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	In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.) In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003) According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. May cause cancer. Occupational exposure to respirable dust and respirable crystalline silica should be monitored and controlled.
ACGIH Carcinogens	
Crystalline silica (CAS 14808-60-7)	A2 Suspected human carcinogen.
Canada - Alberta OELs: Carcinogen category	
Crystalline silica (CAS 14808-60-7)	Suspected human carcinogen.
Canada - Manitoba OELs: carcinogenicity	
SILICA, CRYSTALLINE-.ALPHA.-QUARTZ, RESPIRABLE FRACTION (CAS 14808-60-7)	Suspected human carcinogen.
Canada - Quebec OELs: Carcinogen category	
Crystalline silica (CAS 14808-60-7)	Suspected carcinogenic effect in humans.
IARC Monographs. Overall Evaluation of Carcinogenicity	
Crystalline silica (CAS 14808-60-7)	1 Carcinogenic to humans.
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	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
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 instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	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

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

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.

Precursor Control Regulations

Not regulated.

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)	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

Country(s) or region	Inventory name	On inventory (yes/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

Issue date	08-16-2016
Version #	01
Disclaimer	Veolia Water Technologies is not able to anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use and or non respect of Veolia Water Technologies' requirement.
Revision information	Product and Company Identification: Product Review

Country(s) or region	Inventory name	On inventory (yes/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

Recommended restrictions	PROFESSIONAL USE ONLY
HMIS® ratings	Health: 3 Flammability: 0 Physical hazard: 1 Personal protection: J
NFPA ratings	Health: 3 Flammability: 0 Instability: 1
Disclaimer	Veolia Water Technologies is not able to anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use and or non respect of Veolia Water Technologies' requirement.
Prepared by	Hydrex Global Platform
This data sheet contains changes from the previous version in section(s):	Product and Company Identification: Product Review Hazards Identification: Ingestion Exposure Controls / Personal Protection: Respiratory protection Physical & Chemical Properties: Multiple Properties Physical & Chemical Properties: Color Physical & Chemical Properties: Odor Chemical Stability & Reactivity Information: Reactivity Ecological Information: Ecotoxicity Disposal Considerations: Contaminated packaging Transport Information: Product Shipping Name/Packing Group Other Information: Disclaimer Other Information: Recommended restrictions GHS: Classification

About AECOM

AECOM (NYSE: ACM) is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.

As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US\$19 billion during the 12 months ended June 30, 2015.

See how we deliver what others can only imagine at aecom.com and [@AECOM](https://twitter.com/AECOM).