Appendix E: Spill Contingency Plan
Revised

DILLON CONSULTING

HAMLET OF PAULATUK

Spill Contingency Plan

Final Report – 2025 Update

November 2025 – 25-1614

Table of Contents

Figures

Tables

Appendices

References

1.0 Introduction

This spill contingency plan applies to the water treatment plant, sewage lagoon and solid waste disposal facilities currently in operation within the municipal boundaries of the Hamlet of Paulatuk (the Hamlet), under water licence #N7L3-1619. The spill contingency plan was developed for these facilities as required for a water licence application for the Hamlet.

Under the *Waters Act (WA)* and Section 5(2) (g) of the Waters Regulation (WR), licence applications must include "where the undertaking involves the handling or storage of petroleum products or hazardous materials, (i) a plan for the safe handling, storage and disposal thereof, and (ii) a contingency plan for their containment and for the clean-up thereof in the event of a spill".

This spill contingency plan is based on the Inuvialuit Water Board's Spill Contingency Plan Template and the Water Resources Division Indian and Northern Affairs Canada document titled, "Guidelines for Spill Contingency Planning" (2007). Both documents can be found on the Inuvialuit Water Board's website.

1.1 Company Name, Location and Mailing Address

This Spill Contingency Plan provides for the prompt and coordinated response of the Hamlet of Paulatuk, NT located 69°21' N latitude and 124°04' W longitude. Contacts for the Hamlet are listed in Table 1.

Hamlet of Paulatuk
Box 98
Paulatuk, NT
X0E 1N0
Phone: 867-580-3531
Fax: 867-580-3703
Email: sao@paulatuk.ca

Table 1: Contact Information

Name	Role	Phone
Aaron Ruben	Senior Administrative Officer	867-580-3531
Ray Ruben Sr.	Mayor	867-580-3531

1.2 Effective Date of Spill Contingency Plan

The effective date of this Spill Contingency Plan is November 2025.

1.3 Distribution list

This plan and the most recent revisions will be distributed as detailed in Table 2.

Table 2: Spill Contingency Plan Distribution List

Organization	Title	Phone	Date to be Distributed
Department of Fisheries and Ocean Canada	Inuvik Office	(867) 777-7500	November 2025
GNWT Department of Environment and Climate Change	Inuvik Office	867-678-8090	November 2025
Inuvialuit Water Board	Main Office	(867) 678-2942	November 2025
Hamlet of Paulatuk	Senior Administrative Officer Aaron Ruben	(867) 580-3531	November 2025
Dillon Consulting Limited	Project Manager Amanda-Brea Watson	(867) 920-4555	November 2025

1.4 List of Revisions

The Spill Contingency Plan should be reviewed annually. Table 3 presents the list of revisions from 2015 to present.

Table 3: List of Revisions

Date	Revisions
July 2015	Preparation of the Spill Contingency Plan for submission with water licence application.
March 2016	Updated as per Water Board Request Letter dated October 1, 2015 and as per the requirements stated under Part F: Conditions Applying to Spill Contingency Planning of Water Licence N7L3-1619 renewed November 21, 2015.
August 2017	Updated as per Inuvialuit Water Board letter dated November 3, 2015 letter
May 2020	Updated as per Inuvialuit Water Board water license application procedures, divided Spill Contingency Plan and Hazardous Waste Management information into two separate plans.
October 2025	Revisions of Spill Contingency Plan for submission with Hamlet of Paulatuk Municipal Water Licence Renewal application.

1.5 Purpose and Scope

The purpose of this plan is to outline response actions for potential spills. 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 should help to reduce potential health and safety hazards, environmental damage, and clean-up requirements. The plan has been prepared with the intent to help provide quick access to information required in responding to a spill.

1.6 Environmental Policy

The Hamlet should, as part of its environmental policy for the operation of the sewage lagoon and solid waste disposal facilities:

- Comply with existing legislation and regulations for water and the environment;
- Provide protection of the environment as is technically feasible and economically practical;
- Cooperate with other relevant groups on the protection of the environment; and
- Keep employees, government officials, and the general public informed.

The Hamlet should be committed to operating in an environmentally sensitive manner, and comply with the requirements of the Inuvialuit Water Board (IWB). All staff associated with these facilities (e.g., current and new employees) and contractors should be made aware of the Spill Contingency Plan, the location of spill kits, and spill response procedures.

The Hamlet should commit to updating the plan if conditions change at the facilities, when technical advancements are available and/or there are updates to legislative/regulatory requirements.

1.7 Project Description

The Hamlet operates under a Type B water licence (N7L3-1619) for the extraction of water from New Water Lake, the disposal of sewage at a local facility, and the disposal of solid waste within a landfill facility.

1.8 Site Description

The Hamlet is located on the south end of Darnley Bay in the Northwest Territories (**Figure 1**). The population of the Hamlet in 2025 was 360 based on data from the NWT Bureau of Statistics (2025). The areas pertaining to this spill contingency plan are the sewage disposal facilities and the solid waste disposal facilities (**Figure 1**). The drinking water source for the Hamlet is New Water Lake, which is located approximately 2.2 km from the community and approximately 2.3 km from the sewage and solid waste disposal facilities (**Figure 1**).

The sewage lagoon facility is a natural lake located approximately 2 km from the community. The lagoon has a natural outflow through with a vegetated corridor that is approximately 300 m long and empties into Darnley Bay.

The Hamlet's solid waste disposal site is located adjacent to the sewage lagoon approximately 2 km from the community and approximately 2.3 km west of New Water Lake (i.e., Hamlet's drinking water supply). The facility includes a municipal solid waste disposal area, a bulky waste disposal area, and a disposal area for the local Northern Store. The facility is located approximately 500 m from Darnley Bay.

Hazardous wastes are disposed of at the maintenance garage, which is located within the community (**Figure 1**).

Based on drainage patterns and facility locations, areas in the vicinity of the Hamlet that may be immediately affected by a potential spill include the wetlands in proximity to the sewage lagoon, Old Water Lake, and Darnley Bay. In addition, areas within the community may be affected if a spill were to occur during sewage and waste disposal removal activities from within the community.

Hazardous Materials Stored on Site

The hazardous materials listed within this section are related to materials stored at the sewage lagoon facility and the solid waste disposal facility within the Hamlet of Paulatuk. Hazardous materials disposed of at the solid waste facility are currently stored within the maintenance garage located off-site within the community. Table 4 details the storage container and stored quantities of hazardous materials. Appendix B details immediately reportable spill quantities.

Table 4: Hazardous Materials Storage

Material	Storage container	Average on-site*	Maximum on-site
Waste oils	45-gallon barrels	2	Until shipped off-site
Batteries (lead-acid)	Pallet – pit at waste site	4 pallets full	Until shipped off-site
Paints	Pallet – pit at waste site	1	Until shipped off-site
Fluids/solvents/waste liquids	45-gallon barrels	10	Until shipped off-site
Propane Tanks	45-gallon barrels	6	Until a full pallet can be shipped off-site
Mercury containing products (e.g., thermostats, fluorescent lights etc.)	90 pound canisters	8 (takes an average of 5-6 years to get a pallet together and barged out)	Until shipped off-site
Raw Sewage	Sewage Lagoon	128,000 m^3	Until shipped off-site
Sodium Hypochlorite (12%)	4 litre container	180 litres	Until shipped off-site
Sodium Hydroxide	20 litre container	40 litres	Until shipped off-site
Citric Acid	20 litre container	40 litres	Until shipped off-site

*Quantities are subject to change depending on the quantities disposed of at the solid waste facility.

**Estimated average as there are no actual volumes available.

At the solid waste facility, hazardous wastes due to the disposal of vehicles and/or indiscriminate waste disposal by community residents may also be present. Empty propane tanks that are collected are stored at the solid waste facility (bulky waste site) and not at the maintenance garage. These propane tanks may contain residual propane.

At the water treatment plant hazardous wastes such as sodium hypochlorite, sodium hydroxide and citric acid are also present.

The Department of Environment and Climate Change (ECC) can handle the final disposal of mercury containing products at no cost other than shipping.

The Material Safety Data Sheets (MSDS) for hazardous materials should be kept at the maintenance garage, updated as required and available for reference. Appendix C of this document has been reserved for the Hamlet to include MSDS for hazardous materials kept on-site. This section is to be updated regularly by the Hamlet Foreman. To ensure that the correct MSDS is being used, the MSDS provided by the manufacturer for the specific product in question must be used. Therefore, the MSDS must be updated regularly as products are purchased for use by Hamlet staff. Information contained within MSDS may also be updated therefore, every time a product is purchased, the MSDS should be requested and kept accessible in the Hamlet's maintenance garage.

1.9 Preventive Measures

The community is concerned about the environment and the possibility of a spill; therefore, precautions should be taken when working with hazardous materials. In order to prevent spill occurrences, the Hamlet should take the following spill prevention measures and general precautions at the various facilities:

- Operators should be trained in safe handling and disposal procedures;
- Operators should ensure that the collection trucks are not filled beyond capacity;
- Truck and equipment inspections should be performed on a regular basis;
- Leaks checks should be performed for motorized vehicles and other equipment on a regular basis;
- Berms and containment measures should be inspected regularly on a scheduled basis;
- Secondary containment measures should be in place at required locations;
- Personal protective equipment (PPE) should be worn at all times when handling hazardous waste;
- MSDS should be readily available for all hazardous waste present on-site;
- Spill kits should be readily available for all spill types;
- Schedules for the various inspections should be prepared and followed by appropriate personnel; and
- Inspection checklists should be prepared and followed by appropriate personnel.

The proposed location for the storage of spill kits is provided in **Figure 1**. In addition, the probable location of spills as related to the sewage lagoon and solid waste facility activities are shown in **Figure 1**.

1.10 Additional Copies

Several copies of the most recent version of the plan should be kept at the Hamlet office and maintenance garage at all times. Additional copies can be obtained by contacting the Hamlet.

1.11 Media and Public Inquiries

The Hamlet of Paulatuk has established procedures for dealing with media and public inquiries. All inquiries are to be directed to the SAO, Aaron Ruben, at the Paulatuk Hamlet office. If the supervisor is not available, there will be another staff member available to act in this position. If a reporter or member of the public arrives at the site unexpectedly, the official in charge of responding to their questions will be the Hamlet Supervisor or designate. If a spill has occurred, a NT Spill Report needs to be filled out. This information is available for the public to view upon request by contacting the NT Spill Line or by viewing the GNWT Hazardous Materials Spills Database online at https://www.gov.nt.ca/ecc/en/spills

2.0 Response Organization

The flow chart depicted in **Figure 2** identifies the response organization, as well as the chain of command for responding to a spill or release. The duties of various response personnel are summarized, and contact information is provided in Section 4.2 (including 24-hour phone numbers). This flowchart must be highly visible at all waste management locations and facilities in case of a spill emergency.

An immediately reportable spill is defined as a release of a substance that is likely to be an imminent human health or environmental hazard or meets or exceeds the volumes outlined on the NT Hazardous Spills website. It will be reported to the NT 24-Hour Spill Report Line at 867-920-8130. Any spills that do not pose an imminent human health or environmental hazard, and are less than the quantities outlined on NT Hazardous Spills website will not be reported immediately to the spill reporting line. Rather, these minor spills will be tracked and documented by the Hamlet Foreman and submitted to the Hamlet SAO either immediately upon request or at a pre-determined reporting interval. If there is any doubt that the quantity spilled exceeds reportable levels, the spill will be reported to the NT 24-Hour Spill Report Line.

In the event of a spill that endangers human life, telephones or CB radios will be used to contact emergency response personnel. The spill will be immediately reported by personnel to the Hamlet Foreman, Hamlet SAO and the NT 24-Hour Spill Report Line.

3.0 Action Plan

3.1 Potential Spill Sizes and Sources

In this section the potential spill event and spill volume are presented for the primary hazardous materials stored at the sewage lagoon and solid waste facilities located in the Hamlet of Paulatuk. The most likely spill discharge volume is indicated and the spill clean-up procedures will focus on spills of this quantity. A worst case scenario is also presented.

3.1.1 Sewage Spills from Sewage Holding Tanks and Trucks

Sewage holding tanks could fail from hairline cracks, corrosion, collision and/or wear and tear due to the environment. Routine inspections consist of looking for leaks from cracks/failures of the tank wall and connections. Owners should visually inspect their tanks several times a year. Failure of a sewage truck or any equipment used while pumping sewage into the truck and/or out of the truck can be prevented by routine inspections by the appropriate personnel. Proper training of truck operators will also provide additional preventive measures for sewage leakage.

The Hamlet is responsible for cleaning and reporting sewage spill events. The Hamlet will be using a sewage truck with a capacity of 2,500 gallons. A worst case scenario would involve the release of a complete truck full of sewage waste during one event.

The direction of potential discharge within the community is likely toward Darnley Bay. The direction of potential discharge at the sewage lagoon facility is toward the adjacent wetland.

3.1.2 Sewage Spills from Sewage Disposal Facilities

The truck turn-around pad and sewage discharge chute associated with sewage disposal facility structures and drainage courses are inspected on an annual basis by the Hamlet. In addition, during the open water months (mid-June to late October) the integrity of the structure is visually checked by Hamlet personnel.

The Hamlet is responsible for cleaning and reporting sewage spill events. A worst case scenario would involve the natural lake to overfill and there is a release of sewage into the wetland system or the surrounding area of the lagoon.

The direction of potential discharge at the sewage lagoon facility is toward the adjacent wetland. The wetland eventually drains into Darnley Bay.

3.1.3 Spills from Fuel Storage

Waste fuel is stored at the maintenance garage located with the community in drums and barrels. Potential spills could result from minor leakages and/or larger punctures in drums or barrels located within the fuel storage areas.

In the event of a spill, the Hamlet is responsible for the cleaning (if safe to do so) and reporting the spill. The individual capacity of the fuel storage drums/barrels are approximately 45 gallons. The number of drums/barrels stored at the maintenance garage is dependent on the quantity of disposed waste fuel. A worst case scenario would involve the release from all drums/barrels present at the maintenance garage during one spill event.

The direction of potential discharge would be toward Darnley Bay, potentially through the community.

3.1.4 Fuel Spill from Sewage Trucks/Waste Disposal Trucks Equipment

Fuel spills can occur during re-fuelling of trucks, as a result of over-filling trucks and improper hose connections to fuel storage tanks. Fuel spills can also occur from accidents involving sewage/waste collection vehicles within the community and at the facilities. In addition, fuel spills may occur due to the disposal of old vehicles at the solid waste facility, and timely removal of the fuel from disposed vehicles should be undertaken. Regular maintenance and oil checks of all trucks should be undertaken to avoid preventable leaks.

In the event of a spill due to facility operations, the Hamlet is responsible for the cleaning (if safe to do so) and reporting the spill. The discharge of a fuel related spill is likely to be under 300 L. A worst case scenario would involve the complete loss of fuel from a truck, an uncontrolled discharge of fuel from a storage tank, and an untimely removal of fuel from disposed vehicles.

The direction of potential discharge at the sewage lagoon is toward the adjacent wetland and subsequently Darnley Bay. The direction of potential discharge at the solid waste facility is toward Darnley Bay and/or Old Water Lake. Similarly, the direction of potential discharges within the community is likely toward Darnley Bay, potentially through the community.

3.1.5 Propane Spill

There are no known active uses of propane at the sewage lagoon and solid waste facilities. Used propane tanks are deposited at the solid waste facility. As a result, only residual amounts of propane are expected to be present at the solid waste facility.

Propane is extremely volatile and is one of the most flammable materials stored on-site; thus, the Fire Department should be the first responder in all spill/release cases involving propane. All non-responders must be kept well away from the area.

A propane spill/release can occur when the cylinder has a leak in or outside fuel storage areas, when propane lines not properly connected to equipment (i.e. kitchen stove, dryer). The complete volume of propane within a cylinder will be released if a leak develops; therefore, safety during emergency response to a propane spill/release is of utmost concern. The propane tanks stored in the solid waste facility are

approximately 90 pounds in size and the number of tanks stored at the solid waste facility varies depending on the disposed quantities. A worst case scenario would involve the release of all propane amounts from all tanks present at the solid waste facility during one spill/release event.

3.1.6 Used Waste Oil or Lubricating Oil Spill

Sources of used waste oil at the facilities include the storage of used oil at the maintenance garage and waste oil contained within vehicles disposed at the solid waste facility.

In the event of a spill due to facility operations, the Hamlet is responsible for the cleaning (if safe to do so) and reporting the spill. The discharge of a potential spill is unknown as the amount of used oil stored at the maintenance garage is dependent on the quantity disposed of at the facility. A worst case scenario would involve the complete release of used oil from all storage drums during one spill event.

The direction of potential discharge would be toward Darnley Bay, potentially through the community. At the solid waste facility, discharge would be towards Darnley Bay.

3.1.7 Water Supply Facilities Spills

The operations building at New Water Lake, and the equipment which operates nearby, present the following spill risks due to the use and storage of chemical products and fuel.

- Diesel, spill size of 250 gallons (approximately 1000 L);
- Oil, spill size of 5 L;
- Glycol, spill size of 5L; and
- Chlorine solution (from powdered calcium hypochlorite), spill size of 20 L.

Note that spill sizes are approximate, and represent the expected maximum volume stored on site.

Due to the proximity to the Hamlet's drinking water source, the following contingency measures have been identified:

- Notify the Municipal Supervisor and the SAO;
- Report the spill to the NT-NU Spill Line (867) 920-8130;
- Contain or divert the spill where possible (consult with the Hamlet of Paulatuk Spill Contingency Plan for appropriate containment measures);
- Consult with regulatory personnel on next steps; and
- Notify the public and implement water use restrictions on the community.

3.2 Procedures for Initial Action

1. Be alert and consider your personal safety first.
2. Assess the hazard to persons in the vicinity of the spill and where possible take action to control danger to human life (ensure safety of everyone).
3. Assess the situation and make arrangements for first aid and removal of injured personnel.

4. Take the necessary action where possible to secure the site to protect human safety.
5. Assess spill hazards and risks.
6. Identify the material or products involved in the spill.
7. If applicable and only if it is safe to do so, remove or shut off all ignition sources.
8. If safe, try to take the appropriate action to stop the spill (e.g., shut off pump, replace cap, tip drum upward, patch leaking hole, create a ditch to stop flow etc.).
9. Use the contents of the nearest spill kit to aid in stopping the spill if it is safe to do so.
10. Take all necessary action (if safe to do so) to contain or prevent the spread of the spilled contents (e.g., use contents of spill kits to place sorbent material on the spill, or use shovel to dig dike to contain spill. Methods will vary depending on the nature of the spill).
11. Gather information on the status of the situation.
12. Regardless of the spill volume, contact the Hamlet Foreman and Hamlet SAO.
13. As soon as possible and if required, contact the NT 24-Hour Spill Report Line at 867-920-8130.
14. If required, complete a spill report form (Appendix C).

3.3 Procedures for Containing and Cleaning up the Spill

If safe to do so, follow these steps:

1. Initiate spill containment by first determining what will be affected by the spill;
2. Assess speed and direction of spill and cause of movement (water, wind and slope);
3. Determine best location for containing spill, avoiding any water bodies; and
4. Have a contingency plan ready in case spill worsens beyond control or if the weather or topography impedes containment.

3.3.1 Sewage Infrastructure

1. Any person who sees a liquid flowing or seeping from a sewage holding tank, a sewage truck or a connection from the truck to a hose or the lagoon should report this to the Hamlet Foreman, the Hamlet SAO, and the homeowners.
2. The Hamlet Foreman should, upon notification, determine the extent and size of the spill. Therefore, the Hamlet Foreman is responsible to take the appropriate action and use the reporting procedures to notify the proper authorities. Since spills of sewage involve an infectious substance that may cause health problems, the local nursing station and Environmental Health Officer should be notified of the spill.
3. If the area in which the spill occurred is accessible to the public or domestic pets, the contaminated area must be clearly marked or cordoned off to restrict access. Keep children and interested bystanders away from clean-up activities.
4. If the spilled material can't be recovered using hand tools, a commercial vacuum/pump truck should be called to remove all visible liquid and solid material. Any spill resulting from the failure of a sewage truck or its connections would necessitate the procurement of vacuum trucks to contain the sewage while any soil or ground material contaminated by the spill is recovered and properly disposed of according to an Environmental Health Officer.

5. Protective clothing (at a minimum, rubber or latex gloves, safety goggles and rubber boots) should be worn when cleaning up a sewage spill. (Dispose of gloves and wash rubber boots and safety goggles when leaving spill site.)
6. When the area is visibly clean, lime will be spread on the ground where the spill took place under the instructions of an Environmental Health Officer. Lime can be obtained from a variety of hardware stores. Please note that hydrated lime is a caustic material and can be dangerous to handle and apply. Lime should only be used or applied by people experienced in using this material.
7. If no lime is available, a chlorine/water solution (bleach) should be applied to the spill area to disinfect. To make a 5% chlorine solution, add 3/4 cup (180 mL) Clorox bleach to one (1) gallon of water. Only use bleach that has "sanitizes" or "kills germs" on the label. Do not mix cleaning/disinfecting products or chemicals. Cleaning products can react with one another to produce toxic vapor or liquid substances.
8. Notify the Hamlet foreman when the clean-up is done.
9. When the spill area has been cleaned (24 hours after the chlorine solution or hydrate lime has been spread), the barriers can be removed and access to the area restored.
10. Any repairs or replacement of the failed tank should take place under acceptable engineering standards.

3.3.2 Lagoon Structure

The lagoon is designated as an exfiltration lagoon. Liquid flows continuously through and is directed toward further polishing in the wetlands.

1. Any person who sees a liquid overflowing from the lagoon should report this to the Hamlet Foreman.
2. The Hamlet Foreman should, upon notification, determine the extent and size of the problem. Therefore, the Hamlet Foreman is responsible to take the appropriate action and use the reporting procedures to notify the proper authorities.
3. Any spill resulting from the lagoon overfilling would likely necessitate the permission from ECC to pump out excess effluent to the wetland until a permanent solution can be developed.
4. The permanent solution might be to construct a new cell to use in conjunction with the current cell or construct a new larger cell capable of holding the community's wastewater effluent. A qualified engineer and contractor would be engaged to undertake the work.

3.3.3 Containment of Spill on Open Water

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water. Containment procedures will vary depending on whether the material floats or sinks, and whether the water is flowing or standing.

1. In the event of a spill, any person who found it should report this to the Hamlet Foreman.

2. The Hamlet Foreman should, upon notification, determine the source, the extent and size of the spill. Therefore, the Hamlet Forman is responsible to take the appropriate action and use the reporting procedures to notify the proper authorities.
3. If the area in which the spill occurred is accessible to the public or domestic pets, the contaminated area must be clearly marked or cordoned off to restrict access. Keep children and interested bystanders away from cleanup activities.
4. Protective clothing (at a minimum, rubber or latex gloves, safety goggles and rubber boots) should be worn when cleaning up a spill. (Dispose of gloves and wash rubber boots and safety goggles when leaving spill site.)
5. Assess speed and direction of spill.
6. Determine best location for containing spill.
7. For floating materials, a surface boom shall be deployed. Booms are commonly used to recover fuel floating on the surface of a lake or slow moving streams. They are released from the shore of a water body to create a circle around the spill. If the spill is away from the shoreline, a boat will need to be used to reach the spill and the boom can be set out. More than one boom may be used at once. Booms may also be used in streams and should be set out at an angle to the current. Booms are designed to float and some have sorbent materials built into them to absorb fuels at the edge of the boom. Fuel contained within the circle of the boom will need to be recovered using sorbent materials or pumps (be sure to use a proper hose and pump rated for the specific type of contaminant) and placed into barrels for disposal. If a boom cannot be installed, weirs may be constructed, especially in shallow areas.
8. Weirs can be used to contain spills in streams and to prevent further migration downstream. Plywood or other materials found on-site can be placed into and across the width of the stream, such that water can still flow under the weir. Spilled fuel will float on the water surface and be contained at the foot of the weir. It can then be removed using sorbents, booms or pumps (be sure to use a proper hose and pump rated for the specific contaminant) and placed into barrels.
9. The On-Scene Coordinator will have to judge whether the impact of the spill will be most reduced by carrying out a containment procedure or by immediately attempting to remove any contaminant from the water. This will depend on the equipment available and how long it will take for additional equipment to arrive. Removed contaminants should be placed on an impermeable contained surface (example poly liner in a depression) or an over pack drum to prevent further seepage.

3.3.4 Containment of Spills on Ice

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. Containment procedures will vary depending on whether the material stays on the ice or sinks into it.

1. In the event of a spill, any person who found it should report this to the Hamlet Foreman.

2. The Hamlet Foreman should, upon notification, determine the source, the extent and size of the spill. The Hamlet Foreman is responsible to take the appropriate action and alert the necessary people.
3. Use the reporting procedures to notify the proper authorities.
4. If the area in which the spill occurred is accessible to the public or domestic pets, the contaminated area must be clearly marked or cordoned off to restrict access. Keep children and interested bystanders away from cleanup activities.
5. Protective clothing (at a minimum, rubber or latex gloves, safety goggles and rubber boots) should be worn when cleaning up a spill. (Dispose of gloves and wash rubber boots and safety goggles when leaving spill site.)
6. Assess speed and direction of spill.
7. Determine best location for containing spill.
8. Spills on ice can be affected by the strength of the ice and the floating or sinking characteristics of the materials. The safe bearing capacity of ice has to be carefully assessed.
9. If the spill does not penetrate the ice, and the ice is safe to work on, sorbent materials can be used to soak up spilled fuel. Remaining contaminated ice/slush can be scraped and shoveled into a barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.
10. If the spill penetrates the ice, dykes can be used to contain fuel spills on ice. By collecting surrounding snow, compacting it, mounding it and watering it down to form a dyke down slope of the spill, a barrier is created thus helping to contain the spill. The collected fuel can then be pumped (be sure to use a proper hose and pump rated for the specific contaminant) into barrels or collected with sorbent materials.
11. For significant spills on ice, trenches can be cut into the ice surrounding and/or down slope of the spill such that fuel is allowed to pool in the trench. It can then be removed via pump (be sure to use a proper hose and pump rated for the specific contaminant) into barrels, collected with sorbent materials, or mixed with snow and shoveled into barrels.

3.3.5 Containment of Spills on Snow

Snow is a natural sorbent; thus, as with spills on soil, spilled contents can be more easily recovered. Therefore, snow should be used as much as possible when it is available.

1. In the event of a spill, any person who found it should report this to the Hamlet Foreman.
2. The Hamlet Foreman should, upon notification, determine the source, the extent and size of the spill. The Hamlet Foreman is responsible to take the appropriate action and alert the necessary people.
3. Use the reporting procedures to notify the proper authorities.
4. If the area in which the spill occurred is accessible to the public or domestic pets, the contaminated area must be clearly marked or cordoned off to restrict access. Keep children and interested bystanders away from cleanup activities.

5. Protective clothing (at a minimum, rubber or latex gloves, safety goggles and rubber boots) should be worn when cleaning up a spill. (Dispose of gloves and wash rubber boots and safety goggles when leaving spill site.)
6. Assess speed and direction of spill.
7. Determine best location for containing spill.
8. Small spills on snow can be easily cleaned up by raking and shoveling the contaminated snow into empty barrels, and storing these at an approved location.
9. Dykes can also be used to contain fuel spills on snow. By compacting snow down slope from the spill, mounding it to form a dyke and watering it down, a barrier is created thus helping to contain the spill. The collected fuel/snow mixture can then be shoveled into barrels, or collected with sorbent materials.

3.3.6 Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent; thus, spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

1. In the event of a spill, any person who found it should report this to the Hamlet Foreman.
2. The Hamlet Foreman should, upon notification, determine the source, the extent and size of the spill. The Hamlet Foreman is responsible to take the appropriate action and alert the necessary people.
3. Use the reporting procedures to notify the proper authorities.
4. If the area in which the spill occurred is accessible to the public or domestic pets, the contaminated area must be clearly marked or cordoned off to restrict access. Keep children and interested bystanders away from cleanup activities.
5. Protective clothing (at a minimum, rubber or latex gloves, safety goggles and rubber boots) should be worn when cleaning up a spill. (Dispose of gloves and wash rubber boots and safety goggles when leaving spill site.)
6. Assess speed and direction of spill.
7. Determine best location for containing spill.
8. In all cases of liquid spills, the initial containment step is to prevent further dispersion. This is done with cut-off ditches and dyking with soil as needed around the spill utilizing mobile heavy equipment. If necessary, absorbents (e.g., Zorbal, Hazorb Pillows, peat moss, sawdust) or gelling agents (e.g., Chemgel) should be spread to prevent further spread or seepage.
9. Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled fuel. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of fuel that may reach it. Fuels that pool up can be removed with sorbent materials or by pump (be sure to use a proper hose and pump rated for the specific contaminant) into barrels. If the spill is migrating very slowly a dyke may not be

necessary and sorbents can be used to soak up fuels before they migrate away from the source of the spill.

10. If you cannot build a dyke, trenches can be dug out to contain spills as long as the top layer of soil is thawed. Shovels, pick axes, or a loader can be used depending on the size of trench required. It is recommended that the trench be dug to the bedrock or permafrost, which will then provide containment layer for the spilled fuel. Fuel can then be recovered using a pump (be sure to use a proper hose and pump rated for the specific contaminant) or sorbent materials. Once the soil has been removed, it should be replaced with clean soil to avoid slumping.

3.3.7 Fire or Explosion

1. In all cases, the first step is to clear people from the surrounding area. Particular care must be taken to prevent inhalation of vapors that are products of combustion.
2. When fire is associated with a spill of hazardous material, the local fire department must be the first responder to fire and explosion occurrence in all cases.
3. The fire department will take all the necessary measures to extinguish the fire.
4. If necessary, the fire department will construct dykes down slope from liquid spills, to minimize spreading of fire and contain unburned fluid. Foam, CO_2, or water will then be used as appropriate for the fire.

3.4 Procedures for Transferring, Storing, and Managing Spill-Related Hazardous Wastes

Loose material should be scooped up (using equipment appropriate to the spill size) and transferred into containers. Any soil beneath the spill, which may have been contaminated, should also be removed where possible, and disposed of with the recovered material.

In most cases, spill clean-ups are initiated at the far end of the spill and contained moving toward the source of the spill. Sorbent socks and pads are generally used for small spill clean-up. A pump with attached fuel transfer hose can suction spills from leaking containers or large accumulations on land or ice, and direct these larger quantities into empty drums. Be sure to use a proper hose and pump rated for the specific fuel or hazardous waste. Hand tools such as cans, shovels, and rakes are also very effective for small spills or hard to reach areas. Heavy equipment can be used if deemed appropriate and necessary, and given space and time constraints.

Used sorbent materials are to be placed in barrels for future disposal. Materials mentioned in this section should be available in the spill kits located at maintenance garage. Following clean-up, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.
For most of the containment procedures outlined in Section 3.3, spilled petroleum products and materials used for containment will need to be placed into containers such as empty waste oil/fuel containers and sealed for proper disposal at an approved disposal facility.

The temporary storage location of spill related hazardous waste is adjacent to the discharge chute for the sewage lagoon.

The final approved destination for the receipt of spill-related hazardous waste is offsite at an approved facility. The Hamlet does not have the resources for on-site permanent storage/management.

3.5 Procedures for Restoring Affected Areas, Providing Inspectors with Status Updates and Clean-up Completion

Once a spill of reportable size has been contained, the Hamlet will consult with the regulatory authorities to determine the level of clean-up required. The Regulator may require a site specific study to ensure appropriate clean-up levels are met. Criteria that may be considered include natural biodegradation of oil, replacement of soil and re-vegetation. Also, the soil will be remediated to meet Government of Northwest Territories (GNWT) soil criteria and water will be addressed so that it meets the Canadian Council of Ministers of the Environment (CCME) requirements.

4.0 Resource Inventory

4.1 On-Site Resources

The proposed spill kit locations are indicated in **Figure 1** (maintenance garage, fire hall, truckfill station). The proposed content of the spill kit is described below. In addition, earth moving and other equipment is listed below.

4.1.1 Proposed Content of Spill Kit

The spill kit should contain the following items listed in Table 5.

Table 5: Proposed Spill Kit Required Items

Tool/Resource	Quantity
Socks/Booms (3" x 4')	30
Pillows (2 L)	30
Dispersal Bags	24
Pairs Gloves	4
Pairs Goggles	2
Pairs Tyvek Coveralls	6
Shovels	4
Spill Signs	2
Emergency Response Guidebook	1
Safety and Compliance Directory	1
Spill Response Pocket Guide	1

This response kit should be designed to contain and collect up to 56 gallons of spilled oil. Additional volumes should be accommodated with the use of absorbent products that should be maintained in inventory in sufficient quantities.

4.1.2 Earth Moving and Other Equipment

Hamlet loader, grader, dump truck, fuel truck and trucks should be made available where appropriate in the event of a spill.

4.1.3 Contents of Tool Kit

Table 6 details the tools currently owned by the Hamlet of Paulatuk.

Table 6: Items for Spill Kits Currently Owned by the Hamlet of Paulatuk

Tool/Resource	Quantity
Shovels	6
Rake	2
Wheelbarrow	1
PPE Equipment Sets	4
Protective Tyvek Coveralls	6
Safety Glasses	2
Ear Plugs, Box	1
First Aid Kits	2
Shovels	6
Rake	2
Wheelbarrow	1

4.2 Off-site Resources

Table 7 details the available off-site resources, including emergency contact information.

Table 7: Off-Site Resource Information

Organization	Location/Contact	Number
Environment and Climate Change Canada	Prairie and Northern Region Edmonton Office	780-951-8600
Department of Fisheries and Oceans	Inuvik Office	867-777-7500
GNWT Environment and Climate Change	Inuvik Office	867-678-8090
NWT Emergency Measures Office	Emergency Number	867-920-2303*
Hamlet of Paulatuk	SAO	867-580-3531
Hamlet of Paulatuk	Foreman	867-580-3039
Hamlet of Paulatuk	Health Care Centre	867-580-3231
Inuvialuit Land Administration	Inuvik Office	867-777-7000
NT 24-Hour Spill Report Line		867-920-8130*
NWT Emergency Services Division-MACA	24 h – Emergency line	867-873-7554*
RCMP	Paulatuk Detachment	867-580-1111
Environmental Health	Inuvik	867-767-9066 ext. 49262
Tele-Care NWT Health Line		1-888-255-1010
NWT Fire Marshal Office	Emergency Number	867-767-9161 ext. 21030
Volunteer Fire Hall	Fire Chief – Bill S Ruben	867-580-3531 ext. 2222

*24-hour phone line

5.0 Training Program

The Department of Environment and Climate Change schedules a few training sessions each year for spill contingency. Selected members from the community works department can attend these training sessions. Once key personnel have the fundamental information, training sessions may be conducted as a part of the normal operation of the sewage and waste disposal facilities. Training will be conducted on an as-needed basis, with a minimum requirement of annual training and spill reporting.

Training records are maintained at the Hamlet office. The Hamlet has the capacity to respond to minor spills. The foreman for housing deals with minor spills since he has spill containment training. The Hamlet will follow-up to determine the specific course taken and the date of the training. For larger spills, a Spill Response Specialist is brought in to the Hamlet to help manage the clean-up. Table 8 is an example of an Employee Training Record which must be maintained by the Hamlet SAO or supervisor.

Table 8: Employee Training Record (to be filled in by Hamlet SAO/Supervisor)

Name	Training Course	Date of Training Course

Figures

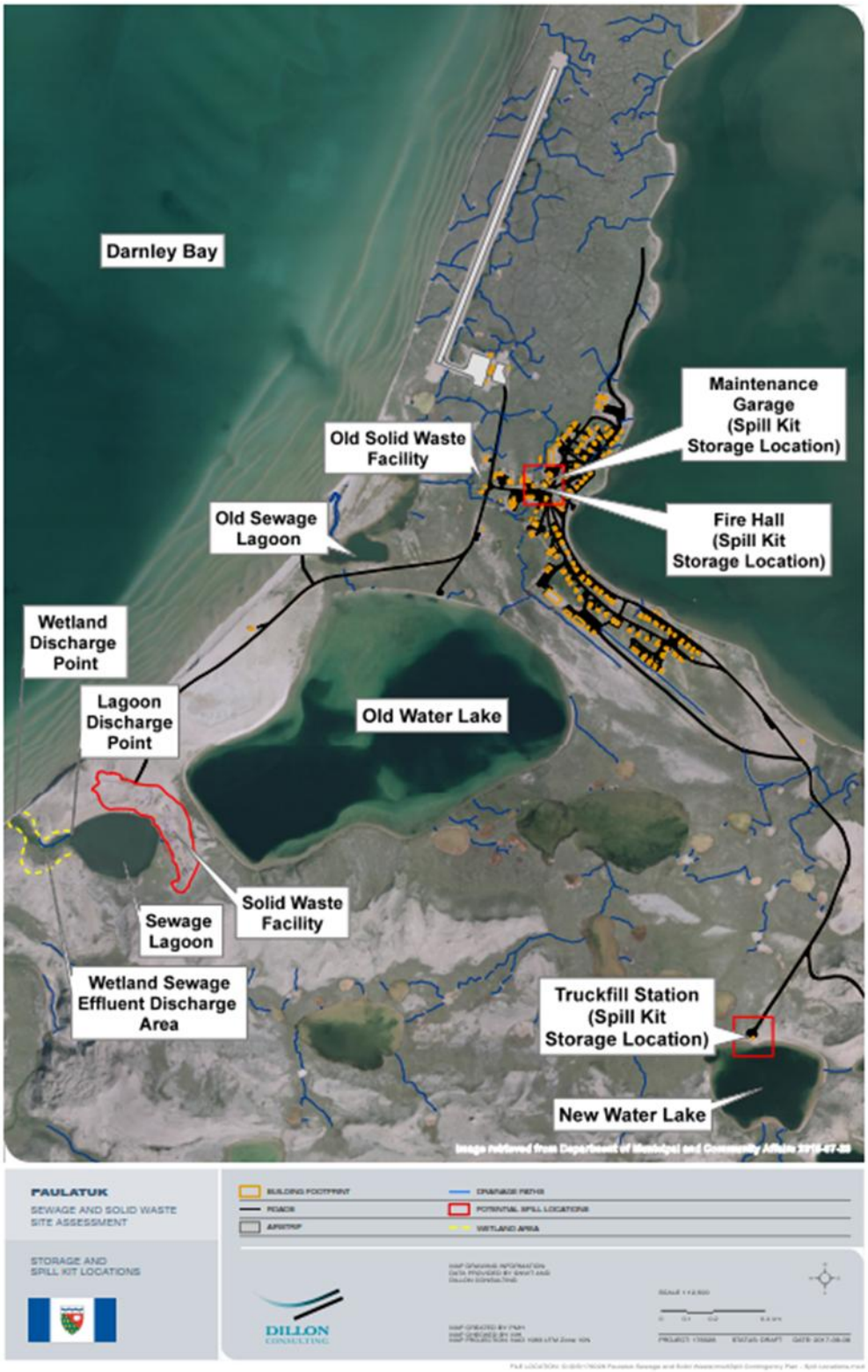


Figure 1: Site Layout and Location of Spill Kits

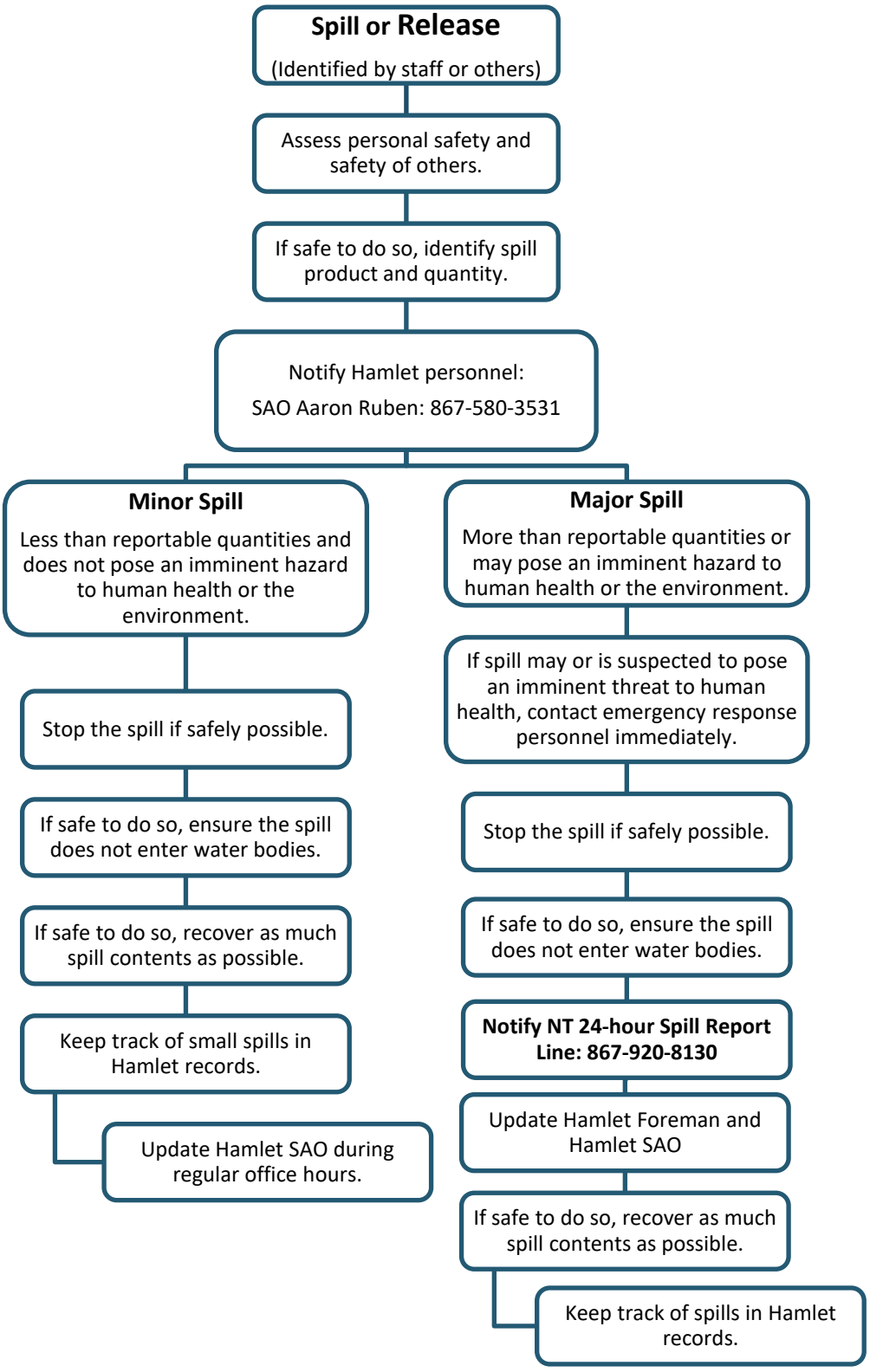


Figure 2: Spill Response Contact and Action Flowchart

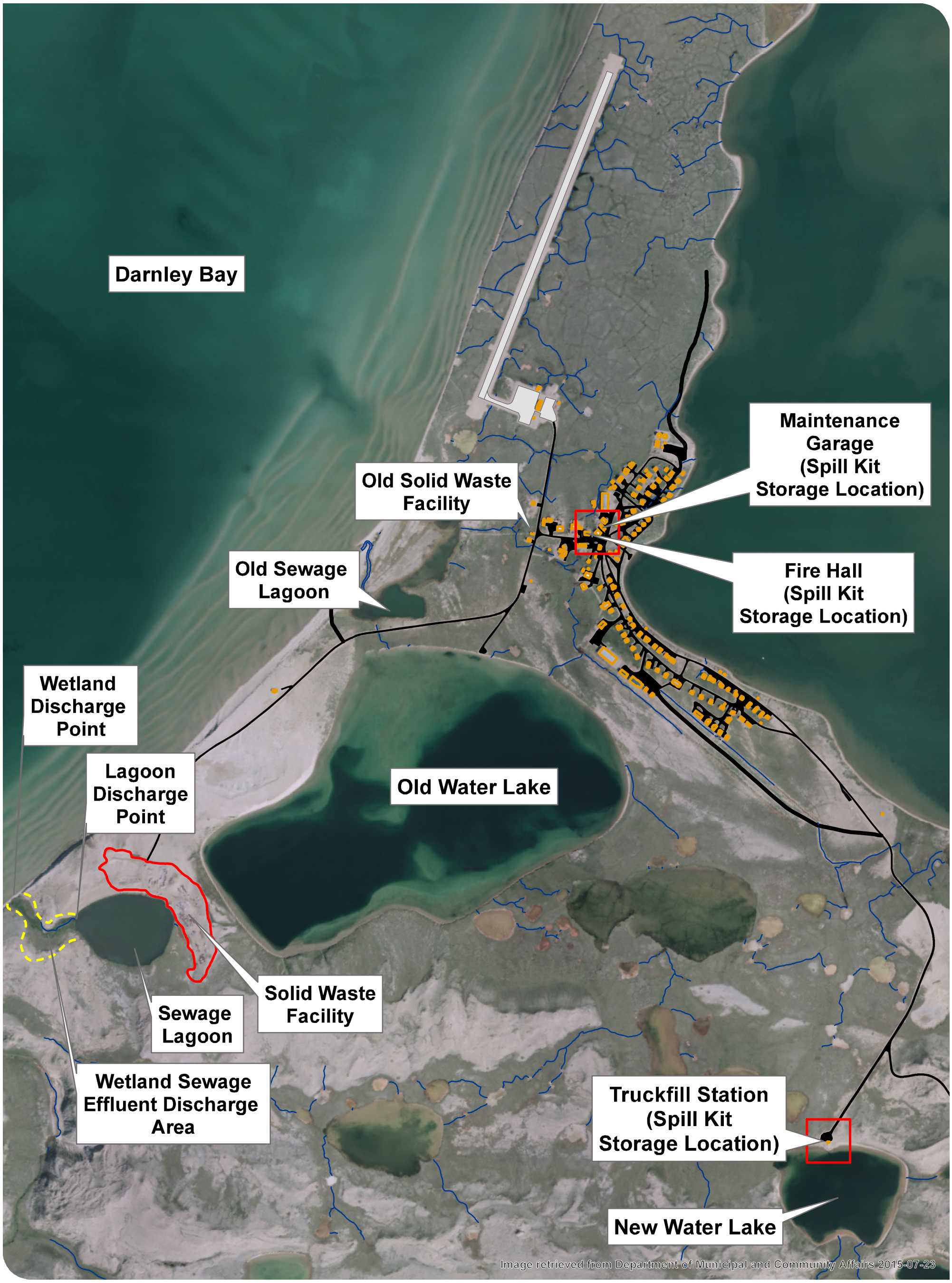
References

Inuvialuit Water Board. *Spill Contingency Plan Template*. Retrieved July 2015, from http://www.nwtwb.com/applicationforms.html

Water Resources Division Indian and Northern Affairs Canada. (2007). *Guidelines for Spill Contingency Planning*. Retrieved July 2015, from http://www.nwtwb.com/guidelines.html

Appendix A

Spill Locations



PAULATUK

SEWAGE AND SOLID WASTE SITE ASSESSMENT

STORAGE AND SPILL KIT LOCATIONS

- BUILDING FOOTPRINT
- ROADS
- AIRSTRIP
- DRAINAGE PATHS
- POTENTIAL SPILL LOCATIONS
- WETLAND AREA

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY GNWT AND DILLON CONSULTING

MAP PROJECTION: NAD 1983 UTM Zone 10N

SCALE 1:12,500

0 0.1 0.2 0.4 km

N W E S

PROJECT: 202937 DATE: 2020-07-16

FILE LOCATION: G:\GIS\176028 Paulatuk Sewage and Solid Waste\mxd\Spill Contingency Plan - Spill Locations.mxd

Appendix B

Immediately Reportable Spill Quantities

Substance	Reportable Quantity	TDG Class
Explosives	Any amount	1.0
Compressed gas (toxic/corrosive)		2.3/2.4
Infectious substances		6.2
Sewage and Wastewater (unless otherwise authorized)		6.2
Radioactive materials		7.0
Unknown substance		None
Compressed gas (Flammable)	Any amount of gas from containers with a capacity greater than 100L	2.1
Compressed gas (Non-corrosive, non-flammable)		2.2
Flammable liquid	≥100 L	3.1/3.2/3.3
Flammable solid	≥ 25 kg	4.1
Substances liable to spontaneous combustion		4.2
Water reactant substances		4.3
Oxidizing substances	≥ 50 L or 50 kg	5.1
Organic peroxides	≥1 L or 1 kg	5.2
Environmentally hazardous substances intended for disposal		9.0
Toxic substances	≥ 5 L or 5 kg	6.1
Corrosive substances		8.0
Miscellaneous products, substances or organisms		9.0
PCB mixtures of 5 or more ppm	≥ 0.5 L or 0.5 kg	9.0
Other contaminants--for example, crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater.	≥ 100 L or 100 kg	None
Sour natural gas (i.e., contains H_2S)	Uncontrolled release or sustained flow of 10 minutes or more	None
Sweet natural gas		
Flammable liquid	≥ 20 L	3.1/3.2/3.3
Vehicle fluid	When released on a frozen water body that is being used as a working surface	None
Reported releases or potential releases of any size that: 1. are near or in an open water body;	Any amount	None

Substance	Reportable Quantity	TDG Class
2. are near or in a designated sensitive environment or habitat; 3. Pose an imminent threat to human health or safety; or 4. Pose an imminent threat to a listed species at risk or its critical habitat		

Source: Department of Environment and Natural Resources, Government of Northwest Territories[1]

Notes:

- L: Litre
- kg: kilogram
- PCB: polychlorinated biphenyls
- ppm: parts per million

[1] Retrieved August 30, 2017 from *http://www.enr.gov.nt.ca/en/services/spills/reporting-spills.*

Appendix C

NT-NU 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:	☐ Original Spill Report **OR** ☐ Update # _____ to the Original Spill Report	**Report Number:**
B	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: ☐ NT ☐ Nunavut ☐ 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: ☐ 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: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

Agency:	**Contact Name:**	**Contact Time:**	**Remarks:**
Lead Agency:			
First Support Agency:			
Second Support Agency:			
Third Support Agency:			

Appendix D

Applicable MSDS and SDS

SAFETY DATA SHEET

Creation Date 20-Aug-2014 **Revision Date** 17-Jan-2018 **Revision Number** 3

1. Identification

Product Name **Mercury (Certified ACS)**

Cat No. : **M141-1LB; M141-6LB**

Synonyms Colloidal mercury; Hydrargyrum; Metallic mercury

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Acute Inhalation Toxicity - Vapors	Category 2
Reproductive Toxicity	Category 1B
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Central nervous system (CNS), Kidney.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Fatal if inhaled
May damage the unborn child
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not get in eyes, on skin, or on clothing
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Skin
Immediately call a POISON CENTER or doctor/physician
IF ON SKIN: Gently wash with plenty of soap and water
Remove/Take off immediately all contaminated clothing
Wash contaminated clothing before reuse
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Mercury	7439-97-6	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Very toxic. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Mercury oxide Highly toxic fumes
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	0	N/A

6. Accidental release measures

Personal Precautions Wear self-contained breathing apparatus and protective suit. Evacuate personnel to safe areas. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Wear self-contained breathing apparatus and protective suit. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Mercury	TWA: 0.025 mg/m³ Skin	(Vacated) TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³ (Vacated) STEL: 0.03 mg/m³ Skin (Vacated) Ceiling: 0.1 mg/m³	IDLH: 10 mg/m³ TWA: 0.05 mg/m³ Ceiling: 0.1 mg/m³	TWA: 0.05 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-38.87 °C / -38 °F
Boiling Point/Range	356.72 °C / 674.1 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	0.002 mmHg @ 25 °C
Vapor Density	7.0
Specific Gravity	13.59 (H2O=1)
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Hg
Molecular Weight	200.59

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Ammonia, Metals, Halogens

Hazardous Decomposition Products Mercury oxide, Highly toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Mercury	7439-97-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects May cause harm to the unborn child.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure Central nervous system (CNS) Kidney

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

This product contains the following substance(s) which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Mercury	Not listed	0.9 mg/L LC50 96h 0.18 mg/L LC50 96h 0.16 mg/L LC50 96h 0.5 mg/L LC50 96h	Not listed	EC50: = 5.0 µg/L, 96h (water flea)

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Mercury - 7439-97-6	U151	-

14. Transport information

DOT

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

TDG

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

IATA

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	UN2809
Proper Shipping Name	MERCURY
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Mercury	X	X	-	231-106-7	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

Component	TSCA 12(b)
Mercury	Section 5

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Mercury	7439-97-6	100	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Mercury	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Mercury	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Mercury	1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Mercury	7439-97-6	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Mercury	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 20-Aug-2014
Revision Date 17-Jan-2018
Print Date 17-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS

Safety Data Sheet

Section 01 Identification

Product Identifier

Sodium Hydroxide Solution

Sodium Hydroxide Solution 0.5%
Sodium Hydroxide Solution 1%
Sodium Hydroxide Solution 4%
Sodium Hydroxide Solution 5%
Sodium Hydroxide Solution 6%
Sodium Hydroxide Solution 8%
Sodium Hydroxide Solution 10% NSF® - 60
Sodium Hydroxide Solution 11% NSF® - 60
Sodium Hydroxide Solution 15% NSF® - 60
Sodium Hydroxide Solution 18% NSF® - 60
Sodium Hydroxide Solution 20% NSF® - 60
Sodium Hydroxide Solution 25% NSF® - 60
Sodium Hydroxide Solution 30% NSF® - 60
Sodium Hydroxide Solution 40% NSF® - 60
Sodium Hydroxide Solution 50% NSF® - 60

Other Means of Identification

Caustic soda, sodium hydrate, lye, liquid caustic, caustic

Product Use and Restrictions on Use

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

Initial Supplier Identifier

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

Phone: 800.387.7503
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Prepared By

ClearTech Industries Inc. technical writer

24-Hour Emergency Phone

306.664.2522

Section 02 Hazard Identification

Physical Hazards

Corrosive to metals Category 1

Health Hazards

Skin corrosion / irritation Category 1

Serious eye damage / eye irritation Category 1

Signal Word

Danger

Hazard Statements

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

Pictograms

Precautionary Statements

Prevention

P234 Keep only in original packaging.

P260 Do not breathe vapours, fumes, and mists.

P264 Wash affected body parts thoroughly after handling.

P280 Wear protective gloves, protective clothing, eye protection, face protection

Response

P301 P330 P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 P361 P353 P363 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse.

P304 P340 P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor.

P305 P351 P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P390 Absorb spillage to prevent material damage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents / container in accordance with all federal, provincial and / or local regulations including the Canadian Environmental Protection Act.

Hazards Not Otherwise Classified

Not available

Supplemental Information

Not available

Section 03 Composition / Information on Ingredients

Hazardous Ingredients:

Chemical name	Common name(s)	CAS number	Concentration (w/w%)
Sodium Hydroxide	Caustic Soda	1310-73-2	0.5-50%

Section 04 First-Aid Measures

Description of necessary first-aid measures

Inhalation	Remove source of exposure or move person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor. If breathing has stopped, trained personnel should begin rescue breathing or if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth to mouth contact by using a barrier device.
Ingestion	Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor. If vomiting occurs naturally, lie on your side, in the recovery position.
Skin contact	Avoid direct contact. Wear chemical protective clothing, if necessary. Take off immediately contaminated clothing, shoes and leather goods. Rinse skin with lukewarm, gently flowing water / shower for 60 minutes. Immediately call a POISON CENTER or doctor. Wash contaminated clothing before re-use, or discard.
Eye contact	Avoid direct contact. Wear chemical protective gloves, if necessary. Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 60 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a POISON CENTER or doctor.

Most important symptoms and effects, both acute and delayed

Inhalation	Causes severe burns to the mouth and throat (mist).
Ingestion	Causes burns to the mouth and throat.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Further information	For further information see Section 11 Toxicological Information.

Section 05 Fire Fighting Measures

Suitable extinguishing media	Extinguish fire using extinguishing agents suitable for the surrounding fire.
Unsuitable extinguishing media	Water jets are not recommended in fires involving chemicals.
Specific hazards arising from the chemical	Reacts with many metals to liberate hydrogen gas that can form explosive mixtures. May release toxic or irritating fumes at high temperatures.
Special protective equipment for fire-fighters	Wear NIOSH-approved self-contained breathing apparatus and chemical-protective clothing.

Section 06 Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment (See Section 08 Exposure Controls and Personal Protection). Stay upwind, ventilate area. Do not breathe vapours, fumes, and mists. Do not use material handling equipment with exposed metal surfaces.
Environmental Precautions	Prevent material from entering waterways, sewers or confined spaces. Notify local health and wildlife officials. Notify operators of nearby water intakes.
Methods and Materials for Containment and Cleaning Up	SMALL SPILLS: Stop or reduce leak if safe to do so. Clean up spill with non-reactive absorbent and place in suitable, covered, labeled containers. Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. LARGE SPILLS: Contact fire and emergency services and supplier for advice.

Section 07 Handling and Storage

Precautions for Safe Handling	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. Prevent the release of vapours, fumes, and mists into the workplace air.

	Inspect containers for damage or leaks before handling. If the original label is damaged or missing replace with a workplace label. Have suitable emergency equipment for fires, spills and leaks readily available. Never add water to a corrosive. Always add corrosives to water. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation. Never return contaminated material to its original container.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight, away from heat sources and incompatible materials. Always store in original labeled container. Keep containers tightly closed when not in use and when empty. Empty containers may contain hazardous residues. Protect label and keep it visible. Do not transfer to metal containers.
Incompatibilities	Acids, such as sulphuric, nitric, hydrochloric, phosphoric, flurosilicic (HFSA), sulphonic, acetic, citric, oxalic, and formic. Metals, such as aluminum and brass. Chlorinated hydrocarbons, flammable liquids, and nitrous compounds.

Section 08 Exposure Controls and Personal Protection

Exposure limits

Component	Regulation	Type of listing	Value
Sodium Hydroxide	ACGIH	STEL/Ceiling	2 mg/m³
	NIOSH	IDLH	10 mg/m³

Engineering controls

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	An emergency shower and eyewash station should be available, tested, and be in close proximity to the product being handled in accordance with provincial regulations.

Protective equipment

The following are recommendations only. It is the responsibility of the employer / user to conduct a hazard assessment of the process in which this product being used and determine the proper engineering controls and PPE for their process. Additional regulatory and safety information should be sought from local authorities and, if needed, a professional industrial hygienist.

Eye and face protection	Where there is potential eye or face exposure, tightly fitting safety goggles and a face shield or a full face respirator or similar protective equipment which protects the wearer's face and eyes are recommended. Contact lenses are not recommended; they may contribute to severe eye injury.
Hand and body protection	Disposable latex or nitrile gloves are recommended to prevent incidental contact. Butyl rubber, neoprene, or PVC skin protection is recommended for extended contact. Leather gloves are not recommended for chemical protection. Refer to manufacturer's specifications for breakthrough times and permeability information; note that breakthrough times and permeability vary with temperature, application and age of material. Continued use of contaminated safety gear or clothing is not recommended; wash before reuse or discard.
Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment. **NIOSH respirator recommendations for: Sodium hydroxide** **Up to: 10 mg/m³** (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

	(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted N100, R100, or P100 filter. (APF = 50) Any self-contained breathing apparatus with a full facepiece. (APF = 50) Any supplied-air respirator with a full facepiece **Emergency or planned entry into unknown concentrations or IDLH conditions:** (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus **Escape:** (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Any appropriate escape-type, self-contained breathing apparatus
Thermal hazards	Not available

Section 09 Physical and Chemical Properties

Appearance

Physical state	Liquid
Colour	Clear to slightly turbid
Odour	Odourless
Odour threshold	Not applicable

Property

pH	>14
Melting point / freezing point	~14 °C (50%)
Initial boiling point and boiling range	~140 °C (50%)
Flash point	Not applicable
Evaporation rate	Not available
Flammability	Not applicable
Upper flammable limit	Not applicable
Lower flammable limit	Not applicable
Vapour pressure	Not available
Vapour density	Not available
Relative density	Not applicable
Solubility	Soluble in water
Partition coefficient: n-octanol/water	Not available
Auto-ignition temperature	Not applicable
Decomposition temperature	Not available
Viscosity	36 cP (40%)
Specific gravity	1.53 g/mL (50%)
Formula	NaOH
Molecular weight	39.997 g/mol

Section 10 Stability and Reactivity

Reactivity	May be corrosive to metals. Reacts with many metals to liberate hydrogen gas that can form explosive mixtures. Reacts with water to generate heat. Reacts violently with acids.
Stability	This product is stable if stored according to the recommendations in Section 07.
Possibility of hazardous reactions	Hazardous polymerization is not known to occur.
Conditions to avoid	Avoid contact with incompatible materials. Do not heat.
Incompatible materials	Acids, such as sulphuric, nitric, hydrochloric, phosphoric, flurosilicic (HFSA), sulphonic, acetic, citric, oxalic, and formic. Metals, such as aluminum and brass. Chlorinated hydrocarbons, flammable liquids, and nitrous compounds.
Hazardous decomposition products	Hydrogen

Section 11 Toxicological Information

Acute Toxicity (LD50 / LC50 values)

Component	Route	Species	Value	Exposure time
Sodium hydroxide	Oral	Rat	140-340 mg/kg	
	Dermal	Rabbit	1350 mg/kg	

Toxic Health Effect Summary

Chemical characteristics	Sodium hydroxide dissociates in aqeous conditions, and thus is not bioavailable. All of it's toxic effects are assumed to be related to it's effect on pH.
Skin	Causes severe skin burns.
Ingestion	Causes burns to the mouth and throat.
Inhalation	Causes severe burns to the mouth and throat (mist).
Eye contact	Causes serious eye damage.
Sensitization	This product and its components at their listed concentration have no known sensitizing effects.
Mutagenicity	This product and its components at their listed concentration have no known mutagenic effects.
Carcinogenicity	This product and its components at their listed concentration have no known carcinogenic effects.
Reproductive toxicity	This product and its components at their listed concentration have no known reproductive effects.
Specific organ toxicity	This product and its components at their listed concentration have no known effects on specific organs.
Aspiration hazard	Not available
Synergistic materials	Not available

Section 12 Ecological Information

Ecotoxicity

Component	Type	Species	Value	Exposure Time
Sodium Hydroxide	EC50	Water Flea	40.38 mg/L	48 hours
	LC50	Guppy	196 mg/L	96 Hours

Biodegradability	The domestic substance list categorizes sodium hydroxide as persistent.
Bioaccumulation	The domestic substance list categorizes sodium hydroxide as non-bioaccumulative.
Mobility	This product is water soluble, is not predicted to adsorb to soil and may contaminate ground water.
Other adverse effects	Aquatic toxicity of sodium hydroxide will be highly dependant on the buffering capacity of the body of water it is released into.

Section 13 Disposal Considerations

Waste From Residues / Unused Products	Dispose in accordance with all federal, provincial, and local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Do not remove label, follow label warnings even after the container is empty. Empty containers should be recycled or disposed of at an approved waste handling facility.

Section 14 Transport Information

UN number	UN1824
UN proper shipping name and description	SODIUM HYDROXIDE SOLUTION
Transport hazard class(es)	8
Packing group	II
Excepted quantities	1 L
Environmental hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special precautions	No special provisions
Transport in bulk	ERAP index: not available

MARPOL 73/78 and IBC Code:

Product name:	Sodium hydroxide solution
Pollution category:	Y
Hazards:	the product is included in the Code because of both its safety and pollution hazards.
Ship type:	ship type 3
Tank type:	integral gravity tank
Tank vents:	open venting
Tank environmental control:	no special requirements under this Code
Electrical equipment:	Temperature classes Apparatus group Flash point non-flammable product
Gauging:	open gauging
Vapour detection:	no special requirements under this Code
Fire protection:	no special requirements under this Code
Emergency equipment	no special requirements under this Code
Specific and operational requirements	15.19.6, 16.2.6, 16.2.9

Additional information	Secure containers (full or empty) during shipment and ensure all caps, valves, or closures are secured in the closed position.

TDG PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and published test data regarding the classification of this product are listed in the references at section 16 of this SDS.

Section 15 Regulatory Information.

NOTE: THE PRODUCT LISTED ON THIS SAFETY DATA SHEET HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN HAZARDOUS PRODUCTS REGULATIONS. THIS SAFETY DATA SHEET CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

All components of this product appear on the domestic substance list.

NSF Certification: Sodium Hydroxide Solution 50% is certified under NSF / ANSI Standard 60 for corrosion & scale control, and pH adjustment at a maximum dosage of: 100 mg/LNSF product use restrictions based on requirements obtained from the NSF website; consult NSF website for current requirements.

Section 16 Other Information

Date of latest revision: June 08, 2020

Note: The responsibility to provide a safe workplace remains with the buyer / user. The buyer / 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 buyer / user to comply with all applicable laws and regulations regarding handling, using, reselling and shipping this product.

Attention: Receiver of the chemical goods / SDS coordinator

As part of our commitment to the RDC Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached 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 center.

References:

1) CHEMINFO
2) TOXNET
3) eChemPortal
4) ECHA
5) Transportation of Dangerous Goods Canada
6) HSDB
7) PAN

Safety Data Sheet

Section 01 Identification

Product Identifier	Citric Acid Solution Citric Acid 15%, Solution Citric Acid 50%, Solution Citric Acid 50%, Solution, NSF® - 60
Other Means of Identification	2-hydroxyl-1,2,3-propanyl-tri-carboxylic acid
Product Use and Restrictions on Use	Membrane cleaning in water treatment, pipe cleaning, metal oxide deposit removal in boilers
Initial Supplier Identifier	ClearTech Industries Inc 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7 Phone: 800.387.7503 Fax: 888.281.8109 www.cleartech.ca
Prepared By	ClearTech Industries Inc. technical writer
24-Hour Emergency Phone	306.664.2522

Section 02 Hazard Identification

Physical Hazards

Corrosive to metals	Category 1

Health Hazards

Skin corrosion / irritation	Category 2
Serious eye damage / eye irritation	Category 2

Signal Word

Warning

Hazard Statements

H290 May be corrosive to metals.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Pictograms

Precautionary Statements

Prevention

P234 Keep only in original packaging.

P264 Wash affected body parts thoroughly after handling.

P280 Wear protective gloves, eye protection, face protection.

Response

P305 P351 P338 P337 P313 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.

P390 Absorb spillage to prevent material damage.

Hazards Not Otherwise Classified

Not available

Supplemental Information

Not available

Section 03 Composition / Information on Ingredients

Hazardous Ingredients:

Chemical name	Common name(s)	CAS number	Concentration (w/w%)
2-hydroxypropane-1,2,3-tricarboxylic acid	Citric acid	77-92-9	14-52%

Section 04 First-Aid Measures

Description of necessary first-aid measures

Inhalation Get medical advice / attention if you feel unwell or are concerned. Remove source of exposure or move person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.

Ingestion Rinse mouth. Get medical advice / attention if you feel unwell or are concerned.

Skin contact Avoid direct contact. Wear chemical protective clothing, if necessary. Take off immediately contaminated clothing, shoes and leather goods. Rinse skin with lukewarm, gently flowing water / shower for 15 to 20 minutes. Get medical advice / attention. Wash contaminated clothing before re-use, or discard.

Eye contact Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for 15 to 20 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. If eye irritation persists: Get medical advice / attention.

Most important symptoms and effects, both acute and delayed

Inhalation May cause respiratory irritation.

Ingestion May cause discomfort or nausea.

Skin contact Causes skin irritation.

Eye contact Causes serious eye irritation.

Further information For further information see Section 11 Toxicological Information.

Section 05 Fire Fighting Measures

Suitable extinguishing media	Extinguish fire using extinguishing agents suitable for the surrounding fire.
Unsuitable extinguishing media	Not available
Specific hazards arising from the chemical	Reacts with many metals to liberate hydrogen gas that can form explosive mixtures. In the event of a fire oxides of carbon may be released. Thermal decomposition occurs at 175 °C.
Special protective equipment for fire-fighters	Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Section 06 Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment (See Section 08 Exposure Controls and Personal Protection). Stay upwind, ventilate area. Only enter area with PPE.
Environmental Precautions	Prevent material from entering waterways, sewers or confined spaces. Notify local health and wildlife officials. Notify operators of nearby water intakes.
Methods and Materials for Containment and Cleaning Up	SMALL SPILLS: Stop or reduce leak if safe to do so. Clean up spill with non-reactive absorbent and place in suitable, covered, labeled containers. Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. LARGE SPILLS: Contact fire and emergency services and supplier for advice.

Section 07 Handling and Storage

Precautions for Safe Handling	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. Inspect containers for damage or leaks before handling. If the original label is damaged or missing replace with a workplace label. Have suitable emergency equipment for fires, spills and leaks readily available.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight, away from heat sources and incompatible materials. Always store in original labeled container. Keep containers tightly closed when not in use and when empty. Empty containers may contain hazardous residues. Protect label and keep it visible. Do not transfer to metal containers.
Incompatibilities	Bases, such as potassium hydroxide, sodium hydroxide, calcium hydroxide (slaked lime), ammonia, carbonates. Oxidizing agents, such as oxygen, hydrogen peroxide, sulphuric and nitric acids, hypochlorites and permanganates. Reducing agents, such as hydrogen, sodium borohydride, sulphur dioxide, thiosulphates, hydrazine, phosphites, carbon, and oxalic, formic and ascorbic acid. Metals, such as aluminum, copper, and zinc.

Section 08 Exposure Controls and Personal Protection

Exposure limits

There are no known exposure limits for this product.

Engineering controls

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions should be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	A soak hose and eyewash station or emergency shower and eyewash station should be available, tested, and be in close proximity to the product being handled in accordance with provincial regulations.

Protective equipment

The following are recommendations only. It is the responsibility of the employer / user to conduct a hazard assessment of the process in which this product being used and determine the proper engineering controls and PPE for their process. Additional regulatory and safety information should be sought from local authorities and, if needed, a professional industrial hygienist.

Eye and face protection	Where there is potential eye or face exposure, tightly fitting chemical goggles are recommended. Contact lenses are not recommended; they may contribute to severe eye injury.
Hand and body protection	Where handling this product it is recommended that chemically resistant gloves are wornskin contact is avoided. Where there is potential for contact with clothing or skin, rubber boots and sufficient body protection, such as: a chemical body suit or an apron and coveralls of chemical resistant material, are recommended. Continued use of contaminated safety gear or clothing is not recommended; wash before reuse or discard.
Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment.
Thermal hazards	Not available

Section 09 Physical and Chemical Properties

Appearance

Physical state	Liquid
Colour	Clear
Odour	Odourless
Odour threshold	Not applicable

Property

pH	<1.0 (50% solution)
Melting point / freezing point	10-15 °C (50% solution)
Initial boiling point and boiling range	>100 °C
Flash point	Not applicable
Evaporation rate	Not available
Flammability	Not applicable
Upper flammable limit	Not available
Lower flammable limit	Not available

Vapour pressure	Not available
Vapour density	Not available
Relative density	Not applicable
Solubility	Soluble in water
Partition coefficient: n-octanol/water	Log Kow: -0.2 to -1.8
Auto-ignition temperature	Not applicable
Decomposition temperature	175 °C
Viscosity	Not available
Specific gravity	1.24-1.26 g/mL (50%)
Formula	$C_6H_8O_7$
Molecular weight	192.13 g/mol

Section 10 Stability and Reactivity

Reactivity	May be corrosive to metals. Reacts with many metals to liberate hydrogen gas that can form explosive mixtures. Reacts violently with bases.
Stability	This product is stable if stored according to the recommendations in Section 07.
Possibility of hazardous reactions	Hazardous polymerization will not occur.
Conditions to avoid	Avoid contact with incompatible materials. Do not heat.
Incompatible materials	Bases, such as potassium hydroxide, sodium hydroxide, calcium hydroxide (slaked lime), ammonia, carbonates. Oxidizing agents, such as oxygen, hydrogen peroxide, sulphuric and nitric acids, hypochlorites and permanganates. Reducing agents, such as hydrogen, sodium borohydride, sulphur dioxide, thiosulphates, hydrazine, phosphites, carbon, and oxalic, formic and ascorbic acid. Metals, such as aluminum, copper, and zinc.
Hazardous decomposition products	Thermal decomposition may produce oxides of carbon. Thermal decomposition occurs at 175 °C.

Section 11 Toxicological Information

Acute Toxicity (LD50 values)

Component	Route	Species	Value	Exposure time
citric acid	Oral	mouse	5400 mg/kg	
	Dermal	rat	>2000 mg/kg	24 hours

Toxic Health Effect Summary

Chemical characteristics	Citric acid is a metabolic intermediate vital to the TCA respiration pathway found in all animal and plant cells. There is little evience that citric acid and the citrate salts have deleterious effects, even in large doses. Indeed there is some support for the fact that citric acid in the human diet is favourable by inhibiting the formation of calcium oxalate kidney and bladder stones. This statement is applicable to the citrate salts since once absorbed citrate salts will dissociate into citric acid and their counter-ion.
Skin	Causes skin irritation. Not irritating to skin.
Ingestion	May cause discomfort or nausea.
Inhalation	May cause respiratory irritation.
Eye contact	Causes serious eye irritation.
Sensitization	This product and its components at their listed concentration have no known sensitizing effects.
Mutagenicity	This product and its components at their listed concentration have no known mutagenic effects.
Carcinogenicity	This product and its components at their listed concentration have no known carcinogenic effects.
Reproductive toxicity	This product and its components at their listed concentration have no known reproductive effects.
Specific organ toxicity	This product and its components at their listed concentration have no known effects on specific organs.
Aspiration hazard	Not available
Synergistic materials	Not available

Section 12 Ecological Information

Ecotoxicity

Component	Type	Species	Value	Exposure Time
Citric acid	LC50	Leuciscus idus melanotus	440 mg/L	48 hours
	EC50	Daphnia magna	1,535 mg/L	24 hours

Biodegradability	The domestic substance list categorizes citric acid as non-persistent.
Bioaccumulation	The domestic substance list categorizes citric acid as non-bioaccumulative.
Mobility	This product is water soluble, and will not adsorb to soil and may contaminate ground water.
Other adverse effects	Not available

Section 13 Disposal Considerations

Waste From Residues / Unused Products	Dispose in accordance with all federal, provincial, and local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Do not remove label, follow label warnings even after the container is empty. Empty containers should be recycled or disposed of at an approved waste handling facility.

Section 14 Transport Information

UN number	UN3265
UN proper shipping name and description	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Citric acid)
Transport hazard class(es)	8
Packing group	III
Excepted quantities	5 L
Environmental hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special precautions	16 (1) The technical name of at least one of the most dangerous substances that predominantly contributes to the hazard or hazards posed by the dangerous goods must be shown, in parentheses, on the shipping document following the shipping name in accordance with clause 3.5(1)(c)(ii)(A) of Part 3 (Documentation). The technical name must also be shown, in parentheses, on a small means of containment or on a tag following the shipping name in accordance with subsections 4.11(2) and (3) of Part 4 (Dangerous Goods Safety Marks).
Transport in bulk	ERAP index: not available MARPOL 73/78 and IBC Code: Product name: Citric acid (70% or less) Pollution category: Z Hazards: the product is included in the Code because of its pollution hazards. Ship type: ship type 3 Tank type: integral gravity tank Tank vents: open venting Tank environmental control: no special requirements under this Code Electrical equipment: Temperature classes: no information; Apparatus group: no information; Flash point: flashpoint exceeding 60 °C Gauging: open gauging Vapour detection: no special requirements under this Code Fire protection: alcohol-resistant foam or multi-purpose foam Emergency equipment: no special requirements under this Code Specific and operational requirements: no special requirements under this Code
Additional information	Secure containers (full or empty) during shipment and ensure all caps, valves, or closures are secured in the closed position.

TDG PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and published test data regarding the classification of this product are listed in the references at section 16 of this SDS.

Section 15 Regulatory Information.

NOTE: THE PRODUCT LISTED ON THIS SAFETY DATA SHEET HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN HAZARDOUS PRODUCTS REGULATIONS. THIS SAFETY DATA SHEET CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

All components of this product appear on the domestic substance list.

NSF Certification: Citric Acid 50%, Solution, NSF® - 60 is certified under NSF / ANSI Standard 60 for pH adjustment and membrane cleaning at a maximum dosage of: 250 mg/LNSF product use restrictions based on requirements obtained from the NSF website; consult NSF website for current requirements.

Section 16 Other Information

Date of latest revision: July 10, 2019

Note: The responsibility to provide a safe workplace remains with the buyer / user. The buyer / 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 buyer / user to comply with all applicable laws and regulations regarding handling, using, reselling and shipping this product.

Attention: Receiver of the chemical goods / SDS coordinator
As part of our commitment to the RDC Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached 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 center.

References:
1) CHEMINFO
2) TOXNET
3) eChemPortal
4) ECHA
5) Transportation of Dangerous Goods Canada
6) HSDB
7) PAN

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	Calcium Chloride 77%
Other Means of Identification	Calcium chloride dihydrate
Product Use and Restrictions on Use	Industrial uses, drilling mud additives, workover fluids, completion fluids, ice melt, dust control, refrigeration.
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7
Prepared By	ClearTech Industries Inc. Technical Writer Phone: 1 (800) 387-7503
24-Hour Emergency Phone	Phone: 1 (306) 664 – 2522

Section 02 - Hazard Identification

GHS-Classification

Eye Corrosion/Irritation Category 2

Physical Hazards

No known physical hazards.

Warning

Hazard Statements

H319 – Causes serious eye irritation.

Pictograms

Precautionary Statements

P264 – Wash hands thoroughly after handling.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 – If eye irritation persists: Get medical advice/attention.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Chloride, dihydrate	10035-04-8	100%	

Section 04 - First Aid Measures

Inhalation

If symptoms are experienced, remove victim to fresh air. Seek 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

Contact lenses should never be worn when working with this product. Flush immediately with water for at least 30 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion

NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim rinse mouth with water again. Seek medical attention.

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 Measures

Suitable Extinguishing Media

Product does not burn. Use appropriate extinguishing media for material that is supplying the fuel to the fire.

Unsuitable Extinguishing Media

Not Available

Specific Hazards Arising From the Chemical

Well-sealed containers may rupture violently when exposed to fire or excessive heat for sufficient time.

Special Protective Equipment and Precautions for Fire-Fighters

Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Further Information

Not Available

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures

Wear appropriate personal protective equipment. Ventilate area. Only enter area with PPE. Stop or reduce leak if safe to do so. Flush with water to remove any residue.

Environmental Precautions

Prevent material from entering sewers, soils, waterways and groundwater.

Methods and Materials for Containment and Cleaning Up

Contain spilled solutions with earth, sand, or absorbent material which does not react with spilled material. Remove liquid by pumps or vacuum equipment and place in suitable, covered, labelled containers.
Solid spills: Shovel into clean, dry, labelled containers and cover. Flush area with water.

Section 07 - Handling and Storage

Precautions for Safe Handling

This material is an EYE IRRITANT. 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. Avoid formation of dust and aerosols.

Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight and away from sources of heat. Prolonged storage may cause product to cake and become wet. Protect product from moisture.
Incompatibilities	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium Chloride, Dihydrate	Not Available		

Engineering Control(s)

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face	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.
Hand Protection	Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Guidelines for calcium chloride, 30-70%: RECOMMENDED (resistance to breakthrough longer than 4 hours): Tychem(TM) Responder(TM). Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	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.
Thermal Hazards	Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid
Colour	White flakes
Odour	Odourless
Odour Threshold	Not Applicable

Property

pH	8-9 (34% solution)

Melting Point/Freezing Point	176°C
Initial Boiling Point and Boiling Range	1670°C
Flash Point	Not Applicable
Evaporation Rate	Not Applicable
Flammability	Non-Flammable
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Not Applicable
Vapour Density (Air=1)	Not Applicable
Relative Density	1.850 g/cm^3
Solubility(ies)	Very soluble in water. Soluble in ethanol, acetone and acetic acid.
Partition Coefficient: n-octanol/water	Log P_{ow} = 0.05
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	Not Available
Viscosity	Not Applicable
Explosive Properties	Not Available
Specific Gravity (Water=1)	1.85
% Volatiles by Volume	Not Available
Formula	$CaCl_2 \cdot 2H_2O$
Molecular Weight	147.02

Section 10 - Stability and Reactivity

Reactivity	The anhydrous, monohydrate and dehydrate forms of calcium chloride generate large amounts of heat when dissolved in water or during water absorption.
Stability	Product is stable. Hygroscopic.
Possibility of Hazardous Reactions	Polymerization does not occur.
Conditions to Avoid	Exposure to moist air or water, addition to hot water.
Incompatible Materials	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.
Hazardous Decomposition Products	None known.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Calcium Chloride	507mg/kg (rabbit)	2630mg/kg (rabbit)	160mg/m^3 (rat, 4hr)

Chronic Toxicity – Carcinogenicity

Component	IARC
Calcium Chloride, Dihydrate	Not carcinogenic

Skin Corrosion/Irritation	Cause no to slight irritation.
Ingestion	May irritate the mouth and throat. Large doses are expected to cause nausea and vomiting.
Inhalation	Dust or mist inhalation may irritate nose, throat, and lungs.
Serious Eye Damage/Irritation	Calcium chloride can cause serious eye damage based on animal information.
Respiratory or Skin Sensitization	Not Available
Germ Cell Mutagenicity	The available information does not suggest that calcium chloride is a mutagen.
Reproductive Toxicity	The available information does not suggest that calcium chloride is a developmental toxin.
STOT-Single Exposure	Not Available
STOT-Repeated Exposure	Repeated or prolonged contact to calcium chloride powder or solutions has caused inflammation and tissue death.
Aspiration Hazard	Not Available
Synergistic Materials	In animal studies, calcium chloride has decreased chromosome aberrations caused by cobaltous chloride, decreased the tumor promoting activity of sodium chloride and decreased pre-cancerous lesions caused by a known carcinogen

Section 12 – Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium Chloride, Dihydrate	EC_{50}(Diatom, 96hr): 3130mg/L	LC_{50} (Pimephales promelas, 96hr): 4630mg/L	EC_{50}(Daphnia magna, 64hr): 920mg/L

Biodegradability	Calcium chloride does not biodegrade.
Bioaccumulation	Calcium chloride does not bioaccumulate.
Mobility	Calcium chloride is readily dissociated into calcium and chloride ions in water. These physico-chemical properties indicate that calcium chloride released into the environment is distributed into the water compartment in the form of calcium and chloride ions.
Other Adverse Effects	Not Available

Section 13 – Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 – Transport Information

UN Number	Not Regulated
UN Proper Shipping Name	Not Regulated
Transport Hazard Class(es)	Not Regulated
Packaging Group	Not Regulated
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 – Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 – Other Information

Preparation Date August 18, 2015

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 / SDS 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 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 center or technical service department.

References:

1) CHEMINFO
2) eChemPortal
3) TOXNET
4) Transport Canada
5) HSDB
6) ECHA
7) PAN

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Fax: 1(888) 281-8109

www.cleartech.ca

24 Hour Emergency Number - All Locations – 1(306) 664-2522

MATERIAL SAFETY DATA SHEET

Calcium Chloride 77%

Section 01 - Product And Company Information

Product Identifier ..... Calcium Chloride 77%

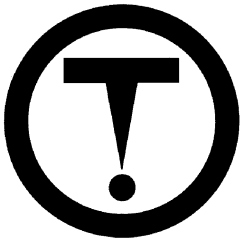
Product Use ..... Industrial uses, drilling mud additives, workover fluids, completion fluids, ice melt, dust control, refrigeration.

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

Preparation Date..... April 5, 2013

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



Section 02 - Composition / Information on Ingredients

Hazardous Ingredients.....	Calcium Chloride, dihydrate	100%
CAS Number.....	Calcium Chloride, dihydrate	10035-04-8
Synonym (s).....	Calcium chloride dihydrate	

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/m^3 (inhalable)
ACGIH/TWA: 3mg/m^3 (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.....…….... 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.....……. 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 Measures

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)…….. 1.85

Vapor Pressure (mm Hg, 20C)…….. 0.01

Vapor Density (Air=1)..……..... Not available

Evaporation Rate.....…….…….. Not available

Boiling Point.....……..... Not applicable to solid material

Freeze/Melting Point...……..... 176^{o}C

pH.......…….. >7 for an aqueous solution

Water/Oil Distribution Coefficient.... Not available

Bulk Density.....…….. 51-60 lb/ft^{3}

% Volatiles by Volume…….…….... Not available

Solubility in Water...……..... Very soluble

Molecular Formula..... $CaCl_2 \cdot 2H_2O$

Molecular Weight..... 147.02

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..... LD_{50}(oral, rat): 918-1668mg/kg
LD_{50}(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 (LC_{50}: > 100mg/L in most sensitive species).

Biodegradability..... Not applicable

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 - Transport Information

TDG Classification

Class..... Not regulated

Group..... Not regulated

PIN Number..... Not regulated

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

WHMIS Classification.....D2

Revision Date.....February 4, 2014

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: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1 (800) 387-7503
Fax: 1 (888) 281-8109

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 - 40th St. S.E.	T2C 2A1	1 (800) 387-7503	1 (888) 281-8109
Edmonton, AB.	12020 - 142nd Street	T5L 2G8	1 (800) 387-7503	1 (888) 281-8109
Saskatoon, SK.	19 Peters Ave, North Corman Park	S7K 1V7	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

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	Calcium Chloride 83%
Other Means of Identification	Calcium chloride flake
Product Use and Restrictions on Use	Industrial uses, drilling mud additives, workover fluids, completion fluids, ice melt, dust control, refrigeration.
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7
Prepared By	ClearTech Industries Inc. Technical Writer Phone: 1 (800) 387-7503
24-Hour Emergency Phone	Phone: 1 (306) 664 – 2522

Section 02 - Hazard Identification

GHS-Classification

Acute Toxicity-Oral	Category 4
Eye Corrosion/Irritation	Category 2

Physical Hazards

No known physical hazards

Warning

Hazard Statements

H302 – Harmful if swallowed.
H319 – Causes serious eye irritation.

Pictograms

Precautionary Statements

P264 – Wash hands thoroughly after handling.
P270 – Do not eat, drink or smoke when using this product.
P301 +P330 + P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P330 – Rinse mouth.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.

P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 – If eye irritation persists: Get medical advice/attention.
P501 – Dispose of contents/container in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium chloride	10043-52-4	83-87%	
Sodium chloride	7647-14-5	1-2%	
Potassium chloride	7447-40-7	2-3%	
Water	7732-18-5	8-14%	

Section 04 - First Aid Measures

Inhalation If symptoms are experienced, remove victim to fresh air. Seek 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 Contact lenses should never be worn when working with this product. Flush immediately with water for at least 30 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim rinse mouth with water again. Seek medical attention.

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 Measures

Suitable Extinguishing Media Product does not burn. Use appropriate extinguishing media for material that is supplying the fuel to the fire.

Unsuitable Extinguishing Media Not Available

Specific Hazards Arising From the Chemical Well-sealed containers may rupture violently when exposed to fire or excessive heat for sufficient time.

Special Protective Equipment and Precautions for Fire-Fighters Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Further Information Not Available

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures Wear appropriate personal protective equipment. Ventilate area. Only enter area with PPE. Stop or reduce leak if safe to do so.

Environmental Precautions Prevent material from entering sewers, soils, waterways and groundwater.

Methods and Materials for Containment and Cleaning Up Sweep up spilled material and place in container for disposal. Flush with water to remove any residue.

Section 07 - Handling and Storage

Precautions for Safe Handling	This material is an EYE IRRITANT. 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. Avoid formation of dust and aerosols.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight and away from sources of heat. Prolonged storage may cause product to cake and become wet. Protect product from moisture.
Incompatibilities	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium Chloride	Not Available		

Engineering Control(s)

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face	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.
Hand Protection	Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Guidelines for calcium chloride, 30-70%: RECOMMENDED (resistance to breakthrough longer than 4 hours): Tychem(TM) Responder(TM). Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	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.
Thermal Hazards	Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid flakes
Colour	White

Odour	Odourless
Odour Threshold	Not Applicable

Property

pH	>7 for an aqueous solution
Melting Point/Freezing Point	260°C
Initial Boiling Point and Boiling Range	Not Applicable
Flash Point	Not Applicable
Evaporation Rate	Not Available
Flammability	Non-Flammable
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Not Available
Vapour Density (Air=1)	Not Available
Relative Density	45-54 lb/ft^3
Solubility(ies)	Very soluble in water
Partition Coefficient: n-octanol/water	Log P_{ow} = 0.05
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	Not Applicable
Viscosity	Not Available
Explosive Properties	Not Available
Specific Gravity (Water=1)	2.16
% Volatiles by Volume	Not Available
Formula	CaCl2
Molecular Weight	110.98

Section 10 - Stability and Reactivity

Reactivity	The anhydrous, monohydrate and dehydrate forms of calcium chloride generate large amounts of heat when dissolved in water or during water absorption.
Stability	Product is stable. Hygroscopic.
Possibility of Hazardous Reactions	Polymerization will not occur.

Conditions to Avoid	Exposure to moist air or water, addition to hot water.
Incompatible Materials	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.
Hazardous Decomposition Products	None known.

Section 11 - Toxicological Information

Acute Toxicity Estimate

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Calcium Chloride 83%	562 mg/kg	2935 mg/kg	180 mg/m^3

This product has been classified in accordance with the Hazardous Products Regulations using ATE formula documented in the GHS standard.

Chronic Toxicity – Carcinogenicity

Component	IARC
Mixture	Not considered carcinogenic

Skin Corrosion/Irritation	Cause no to slight irritation.
Ingestion	May irritate the mouth and throat. Large doses are expected to cause nausea and vomiting.
Inhalation	Dust or mist inhalation may irritate nose, throat, and lungs.
Serious Eye Damage/Irritation	Calcium chloride can cause serious eye damage based on animal information.
Respiratory or Skin Sensitization	Not Available
Germ Cell Mutagenicity	The available information does not suggest that calcium chloride is a mutagen.
Reproductive Toxicity	The available information does not suggest that calcium chloride is a developmental toxin.
STOT-Single Exposure	Not Available
STOT-Repeated Exposure	Repeated or prolonged contact to calcium chloride powder or solutions has caused inflammation and tissue death.
Aspiration Hazard	Not Available
Synergistic Materials	In animal studies, calcium chloride has decreased chromosome aberrations caused by cobaltous chloride, decreased the tumor promoting activity of sodium chloride and decreased pre-cancerous lesions caused by a known carcinogen

Section 12 – Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium Chloride	EC_{50}(Diatom, 96hr): 3130mg/L	LC_{50}(Pimephales promelas, 96hr): 4630mg/L	LC_{50}(Daphnia magna, 64hr): 920mg/L
Potassium Chloride	EC_{50}(Diatom, 96hr): 1337mg/L	LC_{50}(Gambusia affinis, 96hr): 435mg/L	LC_{50}(Daphnia magna, 96hr): 29mg/L
Sodium Chloride	EC_{50}(Duckweed, 7d): 4880mg/L	LC_{50}(Lepomis macrochirus, 96hr): 5840mg/L	LC_{50}(Daphnia magna, 48hr): 402.6mg/L

Biodegradability	Calcium chloride does not biodegrade.

Bioaccumulation	Calcium chloride does not bioaccumulate.
Mobility	Calcium chloride is readily dissociated into calcium and chloride ions in water. These physico-chemical properties indicate that calcium chloride released into the environment is distributed into the water compartment in the form of calcium and chloride ions.
Other Adverse Effects	Not Available

Section 13 – Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 – Transport Information

UN Number	Not Regulated
UN Proper Shipping Name	Not Regulated
Transport Hazard Class(es)	Not Regulated
Packaging Group	Not Regulated
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

TDG PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 14 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 – Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 – Other Information

Preparation Date	August 18, 2015

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 / SDS 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 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 center.

References:

1) CHEMINFO
2) eChemPortal
3) TOXNET
4) Transportation of Dangerous Goods Canada
5) HSDB
6) ECHA
7) PAN

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Fax: 1(888) 281-8109

www.cleartech.ca

24 Hour Emergency Number - All Locations – 1(306) 664-2522

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	Calcium Chloride High Test Fines
Other Means of Identification	Calcium chloride high test powder
Product Use and Restrictions on Use	Industrial uses, drill mud additive
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7
Prepared By	ClearTech Industries Inc. Technical Writer Phone: 1 (800) 387-7503
24-Hour Emergency Phone	Phone: 1 (306) 664 – 2522

Section 02 - Hazard Identification

GHS-Classification

Eye Corrosion/Irritation Category 2

Physical Hazards

No known physical hazards.

Warning

Hazard Statements

H319 – Causes serious eye irritation.

Pictograms

Precautionary Statements

P264 – Wash hands thoroughly after handling.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 – If eye irritation persists: Get medical advice/attention.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Chloride	10043-52-4	>94%	

Section 04 - First Aid Measures

Inhalation

If symptoms are experienced, remove victim to fresh air. Seek 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

Contact lenses should never be worn when working with this product. Flush immediately with water for at least 30 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion

NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim rinse mouth with water again. Immediately obtain medical attention

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 Measures

Suitable Extinguishing Media

Product does not burn. Use appropriate extinguishing media for material that is supplying the fuel to the fire.

Unsuitable Extinguishing Media

Not Available

Specific Hazards Arising From the Chemical

Well-sealed containers may rupture violently when exposed to fire or excessive heat for sufficient time.

Special Protective Equipment and Precautions for Fire-Fighters

Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

Further Information

Not Available

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures

Wear appropriate personal protective equipment. Ventilate area. Only enter area with PPE. Stop or reduce leak if safe to do so.

Environmental Precautions

Prevent material from entering sewers, soils, waterways and groundwater. Consult local authorities.

Methods and Materials for Containment and Cleaning Up

Contain spilled solutions with earth, sand, or absorbent material which does not react with spilled material. Remove liquid by pumps or vacuum equipment and place in suitable, covered, labelled containers.
Solid spills: Shovel into clean, dry, labelled containers and cover. Flush area with water.

Section 07 - Handling and Storage

Precautions for Safe Handling	This material is an EYE IRRITANT. 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. Avoid formation of dust and aerosols.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight and away from sources of heat. Prolonged storage may cause product to cake and become wet. Protect product from moisture.
Incompatibilities	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium Chloride	Not Available		

Engineering Control(s)

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face	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.
Hand Protection	Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Guidelines for calcium chloride, 30-70%: RECOMMENDED (resistance to breakthrough longer than 4 hours): Tychem(TM) Responder(TM). Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	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.
Thermal Hazards	Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid
Colour	White powder

Odour	Odourless
Odour Threshold	Not Applicable

Property

pH	>7 for an aqueous solution
Melting Point/Freezing Point	775°C
Initial Boiling Point and Boiling Range	1935°C
Flash Point	Not Applicable
Evaporation Rate	Not Available
Flammability	Non-Flammable
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Negligible
Vapour Density (Air=1)	Not Applicable
Relative Density	58-66 lb/ft^3
Solubility(ies)	Very soluble in water
Partition Coefficient: n-octanol/water	Log P_{OW} = 0.05 (estimated)
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	Not Available
Viscosity	8.997mPa·s (40% aqueous solution at 20°C)
Explosive Properties	Not Available
Specific Gravity (Water=1)	2.15
% Volatiles by Volume	Not Available
Formula	$CaCl_2$
Molecular Weight	110.98

Section 10 - Stability and Reactivity

Reactivity	The anhydrous, monohydrate and dehydrate forms of calcium chloride generate large amounts of heat when dissolved in water or during water absorption.
Stability	Product is stable. Hygroscopic
Possibility of Hazardous Reactions	Polymerization does not occur.

Conditions to Avoid	Exposure to moist air or water, addition to hot water.
Incompatible Materials	Reactive metals, hot water, bromine trifluoride, methyl vinyl ether, furan-2-peroxycarboxylic acid, boric and calcium oxide.
Hazardous Decomposition Products	None known.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Calcium Chloride	507mg/kg (rabbit)	2630mg/kg (rabbit)	160mg/m^3 (rat, 4hr)

Chronic Toxicity – Carcinogenicity

Component	IARC
Calcium Chloride	Not considered carcinogenic

Skin Corrosion/Irritation	Cause no to slight irritation.
Ingestion	May irritate the mouth and throat. Large doses are expected to cause nausea and vomiting.
Inhalation	Dust or mist inhalation may irritate nose, throat, and lungs.
Serious Eye Damage/Irritation	Calcium chloride can cause serious eye damage based on animal information.
Respiratory or Skin Sensitization	Not Available
Germ Cell Mutagenicity	The available information does not suggest that calcium chloride is a mutagen.
Reproductive Toxicity	The available information does not suggest that calcium chloride is a developmental toxin.
STOT-Single Exposure	Not Available
STOT-Repeated Exposure	Repeated or prolonged contact to calcium chloride powder or solutions has caused inflammation and tissue death.
Aspiration Hazard	Not Available
Synergistic Materials	In animal studies, calcium chloride has decreased chromosome aberrations caused by cobaltous chloride, decreased the tumor promoting activity of sodium chloride and decreased pre-cancerous lesions caused by a known carcinogen

Section 12 – Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium chloride	EC_{50}(Diatom, 96hr): 3130mg/L	LC_{50} (Pimephales promelas, 96hr): 4630mg/L	LC_{50}(Daphnia magna, 64hr): 920mg/L

Biodegradability	Calcium chloride does not biodegrade.
Bioaccumulation	Calcium chloride does not bioaccumulate.
Mobility	Calcium chloride is readily dissociated into calcium and chloride ions in water. These physico-chemical properties indicate that calcium chloride released into the environment is distributed into the water compartment in the form of calcium and chloride ions.
Other Adverse Effects	Not Available

Section 13 – Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 – Transport Information

UN Number	Not Regulated
UN Proper Shipping Name	Not Regulated
Transport Hazard Class(es)	Not Regulated
Packaging Group	Not Regulated
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 – Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 – Other Information

Preparation Date	August 18, 2015

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 / SDS 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 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 center or technical service department.

References:

1) CHEMINFO
2) eChemPortal
3) TOXNET
4) Transport Canada
5) CHRIS
6) HSDB
7) ECHA
8) PAN

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Fax: 1(888) 281-8109

www.cleartech.ca

24 Hour Emergency Number - All Locations – 1(306) 664-2522

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	HTH® Extra Dry Chlorine Granular
Other Means of Identification	ClearTech Industries Inc.
Product Use and Restrictions on Use	Disinfection in swimming pools and drinking water supplies; slime and odour control. Sanitizer and oxidizer.
Initial Supplier Identifier	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	Phone: 1 (306) 664 – 2522 Alternative Phone: 1 (800) 387-7503

Section 02 - Hazard Identification

GHS-Classification

Acute Toxicity-Oral	Category 4
Acute Toxicity-Dermal	Category 5
Acute Toxicity-Inhalation	Category 4
Skin Corrosion/Irritation	Category 1A
Serious Eye Damage/Eye Irritation	Category 1
STOT-Single Exposure	Category 3
Acute Aquatic Toxicity	Category 1

Signal Word
Danger

Hazard Statements
Harmful if swallowed.
May be harmful in contact with skin.
Harmful if inhaled.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

Physical Hazards

Oxidizing Solids Category 2

Signal Word
Danger

Hazard Statement
May intensify fire; oxidizer.

Pictograms

Precautionary Statements
Keep away from heat.
Wear protective gloves and eye/face protection.
Take any precaution to avoid mixing with combustibles.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.
Use only outdoors or in well-ventilated area.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
Collect spillage.
Store away from combustibles.
Store locked up.
Store container tightly closed in well-ventilated place.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Hypochlorite	7778-54-3	60-80%	None
Sodium Chloride	7647-14-5	10-20%	None
Calcium Chloride	10043-52-4	0-5%	None
Calcium Hydroxide	1305-62-0	0-4%	None
Calcium Carbonate	471-34-1	0-5%	None
Calcium Chlorate	10137-74-3	0-5%	None
Water	7732-18-5	5.5-10%	None

NOTE: Available chlorine nominal 70.0 w/w%

Common Name and Synonyms Calcium oxychloride; chlorinated lime; hypochlorous acid; Chlortabs; bleaching powder; calcium chlorohydrochlorite; lime chloride.

Section 04 - First Aid Measures

Inhalation Can release corrosive chlorine gas. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the buddy system). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Avoid mouth-to-mouth contact by using mouth guards or shields. Immediately transport victim to an emergency care facility.

Skin Contact / Absorption Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, flush contaminated area with lukewarm, gently flowing water for at least 20-30 minutes, or until the chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). If irritation persists, repeat flushing. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Immediately transport victim to an emergency care facility. Discard contaminated clothing, shoes and leather goods.

Eye Contact Contact lenses should never be worn when working with this product. Avoid direct contact. Wear chemical protective gloves, if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, by the clock, while holding the eyelid(s) open. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Quickly transport victim to an emergency care facility.

Ingestion NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Avoid mouth-to-mouth contact by using mouth guards or shields. Quickly transport victim to an emergency care facility.

Additional Information	Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact. Some recommendations in the above sections may be considered medical acts in some jurisdictions. These recommendations should be reviewed with a doctor and appropriate delegation of authority obtained, as required All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

Section 05 - Fire Fighting Measures

Suitable Extinguishing Media	Calcium hypochlorite does not burn. Extinguish fire using extinguishing agents suitable for the surrounding fire and not contraindicated for use with calcium hypochlorite. Calcium hypochlorite is an oxidizing agent. Therefore, flooding quantities of water spray or fog should be used to fight fires involving calcium hypochlorite.
Unsuitable Extinguishing Media	DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed. DO NOT use carbon dioxide, dry chemical powder or other extinguishing agents that smother flames, since they are not effective in extinguishing fires involving oxidizers.
Specific Hazards Arising From the Chemical	Calcium hypochlorite can undergo accelerated decomposition with the release of significant amounts of heat, chlorine and oxygen, forming an oxygen-rich atmosphere. The heat from the decomposition of calcium hypochlorite combined with an oxygen-rich atmosphere can cause flammable materials to ignite. Fires and explosions involving calcium hypochlorite have occurred. Calcium hypochlorite is a serious fire and explosion hazard when contaminated with or comes in contact with oxidizable, combustible materials (e.g. cloth, greases, leather, oils and solvents, paper, sawdust, rubber, plastics and wood). In these situations, there may be spontaneous ignition and explosion. It decomposes explosively under intense fire conditions and closed containers may rupture violently due to rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time. Combustion and thermal decomposition products include: chlorine, hydrogen chloride gas, oxygen gas and calcium oxides.
Special Protective Equipment and Precautions for Fire-Fighters	The decomposition products of calcium hypochlorite, such as chlorine and hydrogen chloride are extremely hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective equipment (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit and positive pressure self-contained breathing apparatus (NIOSH approved or equivalent)) may be necessary.

Further Information	Extreme caution is required in a fire situation. Evacuate area and fight fire from a protected, explosion-resistant location or maximum possible distance. Approach fire from upwind to avoid hazardous decomposition products, such as chlorine and hydrogen chloride. Wear full protective suit if exposure is possible. See Protection of Firefighters. If possible, isolate materials not involved in the fire, if this can be done without risk, and protect personnel. If calcium hypochlorite is not involved in the fire, move calcium hypochlorite containers from the fire area only if they have not been exposed to heat. Use extreme caution since explosive decomposition can occur under fire conditions with the release of large amounts of oxygen. Otherwise, apply water from as far a distance as possible, in flooding quantities as a spray or fog to keep fire-exposed containers or equipment cool and absorb heat, until well after the fire is out. DO NOT get water inside containers. Remove all flammable and combustible materials from the vicinity, especially oil and grease. Do not direct water directly on leak as this may cause leak to increase. Stay away from ends of tanks, but realize that shrapnel may travel in any direction. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tanks due to fire. In an advanced or massive fire, the area should be evacuated. Use unmanned hoseholders or monitor nozzles. Tanks or drums should not be approached directly after they have been involved in a fire or heated by exposure, until they have been completely cooled down. Clean-up or salvage operations should not be attempted until the calcium hypochlorite is cooled.

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment. Ventilate area. Only enter area with PPE. Stop or reduce leak if safe to do so. Prevent material from entering sewers. Flush with water to remove any residue. Response to a large quantity spill (100 pounds or greater) or when dusting or decomposition gas exposure could occur requires the use of a positive pressure full face supplied air respirator or self contained breathing apparatus (SCBA), chemical resistant gloves, coveralls and boots. In case of fire, this personal protective equipment should be used in addition to normal fire fighter equipment.
Environmental Precautions	Prevent material from entering sewers, waterways and confined spaces. Advise local authorities of any contaminated water release.

Methods and Materials for Containment and Cleaning Up

Do not touch spilled material. Prevent material entering sewers or confined spaces. Keep materials which can burn away from spilled material. Assume the spilled material to be contaminated.

SMALL SPILLS: Collect, using a clean, dry, shovel, transfer to a container, which contains water. Carefully destroy the hypochlorite by adding hydrogen peroxide (one pint of 35% hydrogen peroxide solution per pound of calcium hypochlorite). Hydrogen peroxide reacts with calcium hypochlorite to form calcium chloride and oxygen gas. Do not close container. Other chemicals, which can be used to break down calcium hypochlorite, are sodium sulfite and sodium bisulfite.
Once the calcium hypochlorite is reduced with either sodium sulfite or sodium bisulfite, the remaining solution should be neutralized cautiously with dilute hydrochloric or sulfuric acid.

LARGE SPILLS: Contact fire and emergency services and the supplier for advice.

NOTE: Oxygen may be released during neutralization. Decontamination should be done in an open container, in a well-ventilated area away from sources of ignition.

DANGER: All spills of this product should be treated as contaminated. Contaminated product may initiate a chemical reaction that may spontaneously ignite any combustible material present, resulting in a fire of great intensity. In case of a spill, separate all spilled product from packaging, debris and other material. Using a clean broom or shovel, place all spilled product into plastic bags, and place those bags into a clean, dry disposal container, properly marked and labeled. Disposal containers made of plastic or metal are recommended. Do not seal disposal containers tightly. Immediately remove all product in disposal containers to an isolated area outdoors. Place all damaged packaging material in a disposal container of water to assure decontamination (i.e. removal of all product) before disposal. Place all undamaged packaging in a clean, dry container properly marked and labeled.

Section 07 - Handling and Storage

Precautions for Safe Handling

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.

Conditions for Safe Storage

Keep product tightly sealed in original containers. Store product in a cool, dry, well-ventilated area. Store away from combustible or flammable products. Keep product packaging clean and free of all contamination, including, e.g. other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.
Do not store product where the average daily temperature exceeds 35°C / 95°F. Storage above this temperature may result in rapid decomposition, evolution of chlorine gas and heat sufficient to ignite combustible products. Shelf life (that is, the period of time before the product goes below stated label strength) is determined by storage time and temperatures. Store in a cool, dry and well-ventilated area. Prolonged storage at elevated temperatures will significantly shorten the shelf life. Storage in a climate controlled storage area or building is recommended in those areas where extremes of high temperature occur.
Do Not Store At temperatures Above: Average daily temperature of 35°C / 95°F. Storage above this temperature may result in rapid decomposition, evolution of chlorine gas and heat sufficient to ignite combustible products. Keep away from incompatible materials – see section 10 for more information.

Incompatibilities

Acids, reducing agents, combustible materials such as wood, cloth, or organic materials, dry powder fire extinguishers containing monoammonium phosphate, metals such as iron and copper and their alloys, water or steam, ammonia, urea, amines. Do not allow product to come in contact with other materials, including e.g. other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc. A chemical reaction with such substances can cause a fire of great intensity.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium Hypochlorite	ARCH	ROEG-TWA*	1mg/m^3
	NIOSH	IDHL-TWA	37-38mg/m^3 (based on IDHL concentration of chlorine)
Calcium Hydroxide	ACGIH	TWA	5mg/m^3
	OSHA	TWA	15mg/m^3 (total dust)
Calcium Carbonate	OSHA	TWA	5mg/m^3 (respirable dust fraction)
	OSHA	TWA	15mg/m^3 (total dust)

* Arch Recommended Occupational Exposure Guideline.

Engineering Control(s)

Ventilation Requirements	Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.
Other	Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face	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.
Hand Protection	Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	Use NIOSH-approved respirator - full facepiece with combination chlorine/P100 cartridges when dust is present. Use a self-contained breathing apparatus should be used for major spills. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or if exposure concentrations exceed ten (10) times the published limit.
Thermal Hazards	In case of fire, this personal protective equipment should be used in addition to normal fire fighter equipment.

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid free flowing powder
Colour	White
Odour	Strong chlorine odour
Odour Threshold	~ 1.4 mg/m^3 (based on threshold of chlorine)

Property	
pH	10.5 - 11.5 (1% solution in neutral, distilled water at 25℃)
Melting Point/Freezing Point	Decomposes
Initial Boiling Point and Boiling Range	Not Applicable
Flash Point	Not Applicable
Evaporation Rate	Not Applicable
Flammability	This product is chemically reactive with many substances. Any contamination of the product with other substances by spill or otherwise may result in a chemical reaction and fire. This product is a strong oxidizer which is capable of intensifying a fire once started. Product is not known to be flammable, combustible or pyrophoric.
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20^{o}C)	Not Applicable
Vapour Density (Air=1)	Not Applicable
Bulk Density	0.80 g/mL [average bulk density, loose]
Solubility(ies)	18% in water at 25℃. Product also contains calcium hydroxide and calcium carbonate which will leave a residue.
Partition Coefficient: n-octanol/water	Not Applicable
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	170-180℃
Viscosity	Not Applicable
Explosive Properties	Not sensitive to mechanical impact or static discharge.
Specific Gravity (Water=1)	Not Applicable

% Volatiles by Volume	Not Available
Formula	$Ca(OCl)_2$
Molecular Weight	142.98

Section 10 - Stability and Reactivity

Reactivity	If subjected to excessive temperatures, the product may undergo rapid decomposition, evolution of chlorine gas, and heat sufficient to ignite combustible substances. If product is exposed to small amounts of water, it can react violently to produce heat and toxic gases and spatter. Use copious amounts of water for fires involving this product.
Stability	Stable in optimum storage conditions. Heat, sunlight and contamination could cause decomposition. Product is not sensitive to mechanical shock or impact. Product is not sensitive to electrical static discharge. Product is an NFPA Class 3 oxidizer which can cause a severe increase in fire intensity. Not pyrophoric. Not an organic peroxide.
Possibility of Hazardous Reactions	Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include contact with combustible materials or contact with acids/ammonia. Reactions may include risk of causing or intensifying fire and/or liberation of toxic gas.
Conditions to Avoid	Do not store next to heat source, in direct sunlight, or elevated storage temperature. Do not store where the daily average temperature exceeds 95 ℉. Prevent ingress of humidity and moisture into container or package. Always close the lid.
Incompatible Materials	This product is chemically reactive with many substances, including, e.g., other pool treatment products, acids, organics, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, corrosive ,flammable or combustible materials. Do not allow product to contact any foreign matter, including other water treatment products. Contamination or improper use may cause a fire of great intensity, explosion or the release of toxic gases. If product is exposed to small amounts of water, it can react violently to produce heat and toxic gases and spatter.
Hazardous Decomposition Products	Water in contact with calcium hypochlorite releases chlorine gas. Contact with incompatibles presents an explosion and fire hazard. Toxic or corrosive fumes may be liberated. These include chlorine gas. Decomposition temperature: 170 - 180℃

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	LC_{50}
Calcium Hypochlorite	850mg/kg (rat)	>2,000mg/kg (rabbit)	2.04mg/L (inhalation, rat, 1hr)
Sodium Chloride	3,000mg/kg (rat)	> 10,000mg/kg (rabbit)	> 42mg/L (inhalation, rat, 1hr)
Calcium Chloride	1,000mg/kg (rat)	2,630mg/kg (rat)	Not Available
Calcium Hydroxide	7,340mg/kg (rat)	Not Available	Not Available

Chronic Toxicity – Carcinogenicity

Component	IARC
Hypochlorite Salts	Group 3: Not classifiable as to their carcinogenicity to humans

Skin Corrosion/Irritation

Dry material causes moderate skin irritation. Wet material causes skin burns.

Serious Eye Damage/Irritation

Corrosive to eyes.

Ingestion

When ingested, there will be burning of the mouth and throat. Can cause abdominal cramps, vomiting, diarrhea, nausea, and/or tissue ulceration which may lead to convulsions, coma, and even death.

Inhalation

Dust and mist irritate the nose and throat. In confined areas, mechanical agitation can result in high levels of dust, and reaction with incompatibles materials (ie: acids and water/moisture) can result in high concentrations of chlorine vapour, either of which may result in burns to the respiratory tract, producing lung edema, shortness of breath, wheezing, choking, chest pains, impairment of lung function, and possible permanent lung damage. Lung toxin. Toxic by inhalation.

Respiratory or Skin Sensitization

This material is not known or reported to be a skin or respiratory sensitizer.

Germ Cell Mutagenicity

Calcium hypochlorite has been tested in the Dominant lethal assay in male mice, and it did not induce a dominant lethal response. Calcium hypochlorite has been reported to produce mutagenic activity in two in vitro assays. It has, however, been shown to lack the capability to produce mutations in animals based on results from the micronucleus assay. In vitro assays frequently are inappropriate to judge the mutagenic potential of bactericidal chemicals due to a high degree of cellular toxicity. The concentration which produces mutations in these in vitro assays is significantly greater than the concentrations used for disinfection. Based on high cellular toxicity in in vitro assays and the lack of mutagenicity in animals, the risk of genetic damage to humans is judged not significant.

Reproductive Toxicity

Not reported to show reproductive toxicity.

STOT-Single Exposure	May cause irritation to mucous membranes and respiratory tract.
STOT-Repeated Exposure	Not Available
Aspiration Hazard	Chronic inhalation exposure may cause impairment of lung function and permanent lung damage. Asthma, respiratory and cardiovascular disease may be aggravated by exposure to this chemical.
Synergistic Materials	Not Available

Section 12 - Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium Hypochlorite	Not Available	LC_{50}(bluegill,96 hour): 0.088mg/L LC_{50}(rainbow trout,96 hour): 0.16mg/L	LC_{50}(daphnia magna,48 hour): 0.11mg/L
Calcium Chloride	Not Available	LC_{50}(Bluegill, 96hr): 10,650mg/L LC_{50}(Mosquitofish, 96hr): 13,400mg/L LC_{50}(Fathead minnow, 96hr): 4,630mg/L	LC_{50}(Daphnia magna, 48hr): 2,770mg/L LC_{50}(Ceriodaphnia dubia, 48hr): 1,830mg/L

Biodegradability	Not Available
Bioaccumulation	Not Available
Mobility	Not Available
Other Adverse Effects	Not Available

Section 13 - Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

UN Number	UN 2880
UN Proper Shipping Name	CALCIUM HYPOCHLORITE, HYDRATED MIXTURE with not less than 5.5 percent but not more than 10 percent water.
Transport Hazard Class(es)	5.1
Packaging Group	II
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations Schedule 1, Column 10.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS MSDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS

NSF Certification..... Product is certified under NSF/ANSI Standard 60 for disinfection, oxidation and algicide treatment at a maximum dosage of 15mg/L.

CACD
RESPONSIBILITY MATTERS

Section 16 - Other Information

Preparation Date January 16, 2015

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 / SDS 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 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 center or technical service department.

References

1) Arch Chemicals, Inc. (2013, November 20). Material Safety Data Sheet: HTH Extra. Norwalk, CT.

2) *CHEMINFO: Calcium hypochlorite.* (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/100E.html

3) *CHRIS: Calcium hypochlorite.* (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/chris/records/229.html

4) *HSDB: Calcium hypochlorite.* (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/914.html

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Alternative Phone: 1(800) 387-7503
Fax: 1(888) 281-8109

www.ClearTech.ca

Location	Address	Postal Code	Phone Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1(800)387-7503

CACD
RESPONSIBILITY MATTERS

Port Coquitlam, B.C.	223 Kingsway Avenue	V3C 1S9	1(800)387-7503
Calgary, AB.	5516E - 40th St. S.E.	T2C 2A1	1(800)387-7503
Edmonton, AB.	12020 - 142nd Street	T5L 2G8	1(800)387-7503
Saskatoon, SK.	North Corman Industrial Park	S7K 1V7	1(800)387-7503
Regina, SK.	555 Henderson Drive	S42 5X2	1(800)387-7503
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1(800)387-7503
Mississauga, ON.	355 Admiral Blvd Unit #1	L5T 2N1	1(800)387-7503

24 Hour Emergency Number - All Locations – 1(306) 664-2522
Alternative - 1(800) 387-7503

End of Safety Data Sheet

MATERIAL SAFETY DATA SHEET

Calcium Hypochlorite

Section 01 - Product And Company Information

Product Identifier ..... Pulsar® Plus Tabs

Product Use ..... Disinfection/sanitizer in swimming pools and drinking water supplies; slime and odour control.

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

Preparation Date..... December 6, 2012

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

Section 02 - Composition / Information on Ingredients

Hazardous Ingredients.....	Calcium Hypochlorite	60-80%
	Sodium Chloride	10-20%
	Calcium Chloride	0-5%
	Calcium Hydroxide	0-4%
	Calcium Carbonate	0-4%
	Calcium Chlorate	0-5%
	1,2,4-Butanetricarboxylic Acid, 2-Phosphono-, Sodium Salt	0.2-0.8%
	Water	4.0-8.5%

CAS Number.....	Calcium Hypochlorite	7778-54-3
	Sodium Chloride	7647-14-5
	Calcium Chloride	10043-52-4
	Calcium Hydroxide	1305-62-0
	Calcium Carbonate	471-34-1
	Calcium Chlorate	10137-74-3
	1,2,4-Butanetricarboxylic Acid, 2-Phosphono-, Sodium Salt	40372-66-5
	Water	7732-18-5

Synonym (s).....None

Section 03 - Hazard Identification

Inhalation..... Dust and mist irritate the nose and throat. In confined areas, mechanical agitation can result in high levels of dust, and reaction with incompatibles materials (e.g., acids and water/moisture) can result in high concentrations of chlorine vapour, either of which may result in burns to the respiratory tract, producing lung edema, shortness of breath, wheezing, choking, chest pains, impairment of lung function, and possible permanent lung damage.

Skin Contact / Absorption..... Calcium hypochlorite dust and solutions can cause irritation and in severe cases, chemical burns, which are characterized by redness, swelling, and scab formation. Moisture from perspirations will accelerate tissue destruction.

Eye Contact..... Exposure to calcium hypochlorite can cause eye irritation and vision impairment. Contact can produce impairment of vision and corneal damage.

Ingestion..... When ingested, there will be burning of the mouth and throat. Can cause abdominal cramps, vomiting, diarrhea, nausea, and/or tissue ulceration which may lead to convulsions, coma, and even death.

Exposure Limits..... NIOSH-IDHL= 37-48mg/m^3 based on IDHL concentration of chlorine (calcium hypochlorite)
ACGIH-TWA= 5mg/m^3 (calcium hydroxide)
OSHA-TWA= 15mg/m^3 (calcium hydroxide, total dust)
OSHA-TWA= 15mg/m^3 (calcium carbonate, total dust)
OSHA-TWA= 5mg/m^3 (calcium carbonate, 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 immediate medical attention.

Skin Contact / Absorption..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.

Eye Contact..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.

Ingestion..... Immediately give large amounts of water. Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.

Additional Information..... Probable mucosal damage may contraindicate the use of gastric lavage.

Section 05 - Fire Fighting Measures

Conditions of Flammability..... Non-flammable. Note calcium hypochlorite is a strong oxidizing agent; may form explosive mixtures with combustibles, organic or other oxidizable materials.

Means of Extinction..... Drench with water, and cool surrounding products and area with water. Avoid dry extinguishers containing ammonium compounds.

Flash Point..... Not applicable

Auto-ignition Temperature..... Not applicable

Upper Flammable Limit ..... Not applicable

Lower Flammable Limit..... Not applicable

Hazardous Combustible Products... Chlorine, oxygen, and chlorine monoxide at higher temperatures. Water in contact with hot calcium hypochlorite can release hydrochloric acid or chlorine gas.

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

Explosion Hazards..... Not sensitive to mechanical impact or static discharge.

Section 06 - Accidental Release Measures

Leak / Spill..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Remove all sources of ignition. In case of a spill, separate all spilled product from packaging, debris and other material. Using a clean broom or shovel, place all spilled product into plastic bags, and place those bags into a clean, dry disposal container, properly marked and labeled. Disposal containers made of plastic or metal are recommended. Do not seal disposal containers tightly. Immediately remove all product in disposal containers to an isolated area outdoors. Place all damaged packaging material in a disposal container of water to assure decontamination (ie: removal of all product) before disposal. Place all undamaged packaging in a clean, dry container properly marked and labeled. Prevent material from entering sewers. Flush with water to remove any residue.

Deactivating Materials..... Hydrogen peroxide, sodium sulphite or sodium bisulphite.

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 combustible and flammable products. Keep out of the sun. Keep product pacakging clean and free from contact including other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

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..... Use NIOSH-approved respirator-full facepiece with chlorine and dust/mist cartridges when dust is present. A self-contained breathing apparatus should be used for major spills.

Gloves..... Impervious gloves of chemically resistant material (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.....……..……..... Solid

Odor and Appearance…..…….. White tablets with a strong chlorine odour

Odor Threshold...……..... ~ 1.4 mg/m^3 based on chlorine

Specific Gravity (Water=1)…….. Not applicable

Vapor Pressure (mm Hg, 20C)…….. Not applicable

Vapor Density (Air=1)..……..... Not applicable

Evaporation Rate.....…….…….. Not applicable

Boiling Point.....……..... Not applicable

Freeze/Melting Point...……..... Decomposes at 170-180℃

pH.......…….. 10.4-10.8 (1% solution)

Water/Oil Distribution Coefficient.... Not applicable

Bulk Density.....…….. 1.9 g/cm^3

% Volatiles by Volume…….…….. Not available

Solubility in Water...……..... 18% at 25℃

Molecular Formula.....……..... $Ca(OCl)_2$

Molecular Weight..... 142.98

Section 10 - Stability and Reactivity

Stability..... Stable in optimum storage conditions. Heat, sunlight and contamination could cause decomposition.

Incompatibility..... Acids, reducing agents, combustible materials such as wood, cloth, or organic materials, dry powder fire extinguishers containing monoammonium phosphate, metals such as iron and copper and their alloys, water or steam, ammonia, urea, amines.

Hazardous Products of Decomposition.. Water in contact with calcium hypochlorite releases chlorine gas. Contact with incompatibles presents an explosion and fire hazard. Toxic or corrosive fumes may be liberated. These include chlorine gas.

Polymerization..... Will not occur

Section 11 - Toxicological Information

Irritancy..... Causes irritation and burns to eyes and skin.

Sensitization..... Not available

Chronic/Acute Effects..... Skin irritation may occur from repeated or prolonged skin contact. Chronic inhalation exposure may cause impairment of lung function and permanent lung damage. Asthma, respiratory and cardiovascular disease may be aggravated by exposure to this chemical.

Synergistic Materials..... Not available

Animal Toxicity Data..... LC_{50}(inhalation,rat,1 hour)= 1300mg/m^3 based on chlorine
LD_{50}(oral,rat)= 850mg/kg
LD_{50}(dermal,rabbit)= > 2000mg/kg

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

Reproductive Toxicity..... Not reported to show reproductive toxicity.

Teratogenicity..... Results in laboratory analysis show it is not a tetrogen.

Mutagenicity..... Results in laboratory analysis show it is not a mutagen.

Section 12 - Ecological Information

Fish Toxicity..... LC_{50}(bluegill,96 hour)= 0.088mg/L
LC_{50}(rainbow trout,96 hour)= 0.16mg/L
LC_{50}(daphnia magna,48 hour)= 0.11mg/L

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 - Transport Information

TDG Classification

Class..... 5.1

Group..... II

PIN Number..... UN 1748

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

WHMIS Classification.....C, E

Revision Date.....February 5, 2014

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

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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: 1 (800) 387-7503
Fax: 1 (888) 281-8109

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 - 40th St. S.E.	T2C 2A1	1 (800) 387-7503	1 (888) 281-8109
Edmonton, AB.	11750 - 180th Street	T5S 1N7	1 (800) 387-7503	1 (888) 281-8109
Saskatoon, SK.	19 Peters Ave, North Corman Park	S7K 1V7	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 (888) 281-8109

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	Accu-Tab Calcium Hypochlorite Tablets
Other Means of Identification	None.
Product Use and Restrictions on Use	Disinfection/sanitizer for potable water, wastewater, industrial processing and cooling water.
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7
Prepared By	ClearTech Industries Inc. Technical Writer Phone: 1 (800) 387-7503
24-Hour Emergency Phone	Phone: 1 (306) 664 – 2522

Section 02 - Hazard Identification

GHS-Classification

Acute Toxicity-Oral	Category 4
Skin Corrosion/Irritation	Category 1B
Serious Eye Damage/Irritation	Category 1
STOT-Single Exposure	Category 3

Physical Hazards

Oxidizing Solid	Category 2

Danger

Hazards Statements

H302 – Harmful if swallowed.
H314 – Causes severe skin burns and eye damage.
H318 – Causes serious eye damage.
H272 – May intensify fire; oxidiser.
H335 – May cause respiratory irritation.
EUH031 – Contact with acids liberate toxic gases.

Pictograms

Precautionary Statements
P405 – Store locked up.
P403 + P233 – Store in a well-ventilated place. Keep container tightly closed.
P210 – Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P220 – Keep/Store away from clothing/incompatible and combustible materials.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
P370 + P378 – In case of fire: Use flooding quantities of water spray for extinction.
P271 – Use only outdoors or in a well-ventilated area.
P260 – Do not breathe dust/fume/gas/mist/vapours/spray.
P304 + P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P270 – Do not eat, drink or smoke when using this product.
P301 +P330 + P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303 + P361 + P353 – IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin.
P363 – Wash contaminated clothing before reuse.
P310 – Immediately call a POISON CENTER or doctor/physician.
P501 – Dispose of contents/container in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Hypochlorite	7778-54-3	>65%	
Calcium Chlorate	10137-74-3	<2%	
Calcium Hydroxide	1305-62-0	<2%	
Calcium Carbonate	471-34-1	<2%	

Section 04 - First Aid Measures

Inhalation

Can release corrosive chlorine gas. Take proper precautions to ensure your own safety before attempting rescue. Remove victim to fresh air. If breathing is difficult, oxygen may be administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Avoid mouth-to-mouth contact by using mouth guards or shields. Immediately transport victim to an emergency care facility.

Skin Contact / Absorption

Avoid direct contact. As quickly as possible, flush contaminate area with lukewarm, gently flowing water for at least 30 minutes, or until the chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods. If irritation persists, repeat flushing. DO NOT INTERRUPT FLUSHING. Immediately transport victim to an emergency care facility. Discard contaminated clothing, shoes and leather goods.

Eye Contact

Avoid direct contact. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Quickly transport victim to an emergency care facility.

Ingestion

NEVER give anything by mouth if vicitim is rapidly losing consciousness, is unconscious or convulsing. Have victim rish mouth thoroughly with water. DO NOT INDUCE VOMITING. Have vicitm drink 240 to 300mL of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeta administration of water. Avoid mouth-to-mouth contact by using mouth guards or shields. Quickly transport victim to an emergency care facility.

Additional Information

Provide general supportive measures. Consult a doctor and/or Poison Control Centre for all exposures except minor instances of inhalation or skin contact.

Section 05 - Fire Fighting Measures

Suitable Extinguishing Media	Calcium hypochlorite does not burn. Use extinguishing agents suitable for the surrounding fire and not contraindicated for use with calcium hypochlorite. Calcium hypochlorite is an oxidizing agent. Therefore, flooding quantities of water spray or fog should be used to fight fires involving calcium hypochlorite.
Unsuitable Extinguishing Media	DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed. DO NOT use carbon dioxide, dry chemical powder or other extinguishing agents that smother flames.
Specific Hazards Arising From the Chemical	Calcium hypochlorite can undergo accelerated decomposition with the release of significant amounts of heat, chlorine and oxygen, forming an oxygen-rich atmosphere. Calcium hypochlorite is a serious fire and explosion hazard when contaminated with, or comes in contact, with oxidizable, combustible materials (e.g. cloth, greases, leather, and oils). It decomposes rapidly under intense fire conditions and closed containers may rupture violently due to rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time. Combustion and thermal decomposition products include: chlorine, hydrogen chloride gas, oxygen gas and calcium oxides.
Special Protective Equipment and Precautions for Fire-Fighters	Product decomposes at approximately 170-180°C releasing oxygen gas. Container may rupture. Fire-fighters must wear NIOSH-approved, pressure demand, self-contained breathing apparatus with full face piece for possible exposure to hazardous gases. Emits toxic fumes under fire conditions. If possible, isolate materials not involved in the fire, if this can be done without risk, and protect personnel. If calcium hypochlorite is not involved the fire, move calcium hypochlorite containers form the fire area only if they have not been exposed to heat. DO NOT get water inside containers. Do not direct water directly on leak as this may cause leak to increase.
Further Information	Decomposition products are extremely hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective equipment (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit and positive pressure self-contained breathing apparatus) may be necessary.

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Restrict access to area until completion of cleanup. Ensure cleanup is conducted by trained personnel only. Wear adequate personal protective equipment. Assume spilled material to be contaminated and therefore a fire hazard. Remove all sources of flammable and combustible materials. Ventilate area. Stop or reduce leak if safe to do so. Notify government environmental and occupational health and safety agencies.
Environmental Precautions	Prevent material from entering sewers, waterways or confined spaces. Chlorine is highly toxic to all forms of aquatic life.
Methods and Materials for Containment and Cleaning Up	Keep materials which can burn away from spilled material. Assume the spilled material to be contaminated. SMALL SPILLS: Collect, using a clean, dry shovel. Transfer to a container, that contains water. Carefully destroy the hypochlorite by adding hydrogen peroxide. Hydrogen peroxide reacts with calcium hypchlorite to form calcium chloride and oxygen gas. Do not close container. Other chemicals that can be used are sodium sulfite and sodium bisulfite. Once calcium hypochlorite is reduced, the remaining solution should be neutralized cautiously with dilute hydrochloric or sulfuric acid. LARGE SPILLS: Contact fire and emergency services and the supplier for advice. NOTE: Oxygen may be released during neutralization. Decontamination should be done in an open container, in a well-ventilated area away from sources of ignition.

Section 07 - Handling and Storage

Precautions for Safe Handling

This material is a MODERATE to STRONG OXIDIZER and is CORROSIVE. Calcium hypochlorite solid and solution also release corrosive chlorine gas. 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 only a clean, dry scoop made of metal or plastic each time product is taken from the container. Do not add this product to any dispensing devise containing remnant of any other product. Such use may cause violent reactions leading to fire or explosion. Add this product to water; NEVER add water to product. Do not reuse container. Residual material remaining in empty container can react to cause fire.

Conditions for Safe Storage

Keep product tightly sealed in original containers. Store product in a cool, dry, well-ventilated area. Store away from combustible or flammable products. Keep product packaging clean and free of all contamination.
Do not store product where the average daily temperature exceeds 35°C/95°F. Storage above this temperature may result in rapid decomposition, evolution of chlorine gas and heat sufficient to ignite combustible products.

Incompatibilities

Flammable and combustible materials, ammonia, primary amines, urea, acids, ammonium chloride, ethanol or methanol, hydroxyl compounds, acetylene, acetic acid and potassium cyanide, reducing agents, metal oxides, charcoal, metals, organic sulfur compounds, sulfur, turpentine.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium hypochlorite	Not Available		
Chlorine	ACGIH	TLV-TWA	0.5ppm
	ACGIH	TLV-STEL	1ppm
Calcium chlorate	Not Available		
Calcium hydroxide	ACGIH	TLV-TWA	5mg/m^3
	OSHA	PEL-T-TWA	15mg/m^3
Calcium carbonate	OSHA	PEL-TWA	15mg/m^3

Engineering Control(s)

Ventilation Requirements

Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other

Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face

Chemical goggles, full-face shield, or a full-face respirator should be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.

Hand Protection

Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	No specific guidelines are available. Contact the material manufacturer or supplier for specific advice. Solutions of calcium hypochlorite release corrosive chlorine gas at normal temperatures. The solid material also decomposes to release chlorine gas. For chlorine: Wear NIOSH-approved self-contained breathing apparatus and protective clothing. NOTE: Substance reported to cause eye irritation or damage; may require eye protection. NIOSH RECOMMENDATIONS FOR CHLORINE CONCENTRATIONS IN AIR: Up to 5 ppm: (APF = 10) Chemical cartridge respirator; SAR. Up to 10 ppm: (APF = 25) SAR operated in a continuous-flow mode; Powered, air-purifying respirator with cartridge(s). (APF = 50) Chemical cartridge respirator with a full facepiece and cartridge(s); Air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister; SCBA with a full facepiece; Full facepiece SAR. Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister; Any appropriate escape-type SCBA. NOTE: The IDLH concentration for chlorine is 10 ppm. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory protection equipment. The respirator use limitations specified by the approving agency and the manufacturer must be observed. Recommendations apply only to NIOSH approved respirators. Air-purifying respirators do not protect against oxygen-deficient atmospheres.
Thermal Hazards	Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid
Colour	White
Odour	Slight chlorine odour
Odour Threshold	Not Available

Property

pH	>10.9
Melting Point/Freezing Point	100°C

Initial Boiling Point and Boiling Range	Product decomposes @ 100°C
Flash Point	Not combustible
Evaporation Rate	Not Available
Flammability	Not flammable. Calcium hypochlorite is a strong oxidizing agent and can increase the risk of fire or the intensity of a fire.
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Does not form vapour.
Vapour Density (Air=1)	Not Applicable.
Relative Density	67-71kg/m^3
Solubility(ies)	217g/L @ 27°C in water
Partition Coefficient: n-octanol/water	Log K_{ow} = -2.46
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	170-180°C
Viscosity	Not Applicable
Explosive Properties	Not sensitive to mechanical impact or static discharge.
Specific Gravity (Water=1)	2.35
% Volatiles by Volume	Not Available
Formula	$Ca(ClO)_2$
Molecular Weight	142.98

Section 10 - Stability and Reactivity

Reactivity	The National Fire Protection Association (NFPA) lists calcium hypochlorite (over 50% by weight) as a class 3 oxidizer. Class 3 Oxidizers cause a sever increase in the burning rate of combustible materials with which they came into contact.
Stability	Inherently unstable. The rate of decomposition of the pure, dry material is extremely low at room temperature. Decomposition is accelerated in the presence of small amounts of water, moist air, carbon dioxide and/or the presence of contaminants. When it decomposes, the vigorous reaction generates a great deal of heat, oxygen and very corrosive chlorine gas.
Possibility of Hazardous Reactions	Small quantities will not usually undergo self-heating or spontaneous ignition under normal conditions of storage and handling. However, small quantities may spontaneuously ignite, either through self-heating due to decomposition or due to the presence of contaminants. Self-heating materials can eventually ignite through progeressive accelerating decomposition if they are store or processed above the Self Accelerating Decomposition Temperature (SADT). The decomposition temperature is much lower for bulk quantities than for small quantities.

Conditions to Avoid	Heat, sunlight (a heat source), contamination with combustible materials, moisture/high humidity, acidic conditions, the presence of metals and other impurities.
Incompatible Materials	Flammable and combustible materials, ammonia, primary amines, urea, acids, ammonium chloride, ethanol or methanol, hydroxyl compounds, acetylene, acetic acid and potassium cyanide, reducing agents, metal oxides, charcoal, metals, organic sulfur compounds, sulfur, turpentine.
Hazardous Decomposition Products	Chlorine, oxygen, dichlorine monoxide, calcium chlorate, calcium hydroxide, calcium carbonate.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Calcium hypochlorite	790mg/kg (rat)	>2000mg/kg (rabbit)	Not Available
Calcium chlorate	4500mg/kg (rat)	Not Available	Not Available
Calcium hydroxide	500-2000mg/kg (mouse)	Not Available	Not Available
Calcium carbonate	6450mg/kg (rat)	Not Available	Not Available

Chronic Toxicity – Carcinogenicity

Component	IARC
Calcium hypochlorite	Group 3: Not classifiable to its carcinogenicity to humans.

Skin Corrosion/Irritation	Corrosive to the skin.
Ingestion	Ingestion can cause burning of the mouth and throat. Product can be fatal if swallowed.
Inhalation	Inhalation of dust and deposition of particales in the respiratory tract can lead to irritation of the tissue and cause a variety of effects. These effects are dependent on concentration and include: upper respiratory tract irritation, nasal congestion, coughing, sore throat, laryngitis and shortness or breath. In operations where there are high concentrations of respirable particles, pulmonary edema may be produced.
Serious Eye Damage/Irritation	Corrosive to the eyes.
Respiratory or Skin Sensitization	Not known to be a skin or respiratory sensitizer.
Germ Cell Mutagenicity	There is no human or animal information available. Calcium hypochlorite was mutagenic in bacteria and cultured mammalian cells.
Reproductive Toxicity	Not known to be toxic to reproduction.
STOT-Single Exposure	Severely irritating to respiratory system.
STOT-Repeated Exposure	Calcium hypochlorite can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
Aspiration Hazard	Not Available.
Synergistic Materials	Not Available.

Section 12 – Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium hypochlorite	EC_{50}(Green algae, 72hr): 0.983mg/L	LC_{50}(Lepomis macrochirus, 96hr): 0.057mg/L	EC_{50}(Daphnia magna, 48hr): 0.073mg/L
Calcium chlorate	Not Available	Not Available	Not Available
Calcium hydroxide	EC_{50}(Blue-green algae, 22hr): 84mg/L	LC_{50}(Gambusia affinis, 96hr): 160mg/L	LC_{50}(Crangon septemspinosa, 96hr): 158mg/L
Calcium carbonate	Not Available	LC_{50}(Gambusia affinis, 96hr): >56000mg/L	Not Available

Biodegradability Product is not biodegradable. Chlorine can however be converted to chloride by reducers in the natural environment. Presence of light will accelerate dissipation of chlorine in water.

Bioaccumulation There is no potential for bioaccumulation.

Mobility Not Available.

Other Adverse Effects Chlorine is highly toxic to all forms of aquatic life.

Section 13 – Disposal Considerations

Waste From Residues/Unused Products Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Contaminated Packaging Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 – Transport Information

UN Number UN2880

UN Proper Shipping Name CALCIUM HYPOCHLORITE, HYDRATED MIXTURE

Transport Hazard Class(es) 5.1

Packaging Group II

Environmental Hazards Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.

Special Precautions Not Available

Transport in Bulk Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 – Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 – Other Information

Preparation Date September 8, 2015

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 / SDS 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 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 center or technical service department.

References:

1) CHEMINFO
2) eChemPortal
3) TOXNET
4) Transport Canada
5) HSDB
6) ECHA
7) PAN

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Fax: 1(888) 281-8109

www.cleartech.ca

24 Hour Emergency Number - All Locations – 1(306) 664-2522

Safety Data Sheet

Section 01 - Product And Company Identification

Product Identifier	Accu-Tab Blue SI Calcium Hypochlorite Tablets
Other Means of Identification	Not Available
Product Use and Restrictions on Use	Disinfection/sanitizer for potable water, wastewater, industrial processing and cooling water.
Initial Supplier Identifier	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	Phone: 1 (306) 664 – 2522 Alternative Phone: 1 (800) 387-7503

Section 02 - Hazard Identification

GHS-Classification

Acute Toxicity-Oral	Category 4
Skin Corrosion/Irritation	Category 1A
Serious Eye Damage/Eye Irritation	Category 1
STOT-Single Exposure	Category 3
Acute Aquatic Toxicity	Category 1

Signal Word
Danger

Hazard Statements
Harmful if swallowed.
Causes severe skin burns and eye damage.

May cause respiratory irritation.
Very toxic to aquatic life.

Physical Hazards

Oxidizing Solids	Category 2

Signal Word
Danger

Hazard Statement
May intensify fire; oxidizer.

Pictograms

Precautionary Statements
Keep away from heat.
Wear protective gloves and eye/face protection.
Take any precaution to avoid mixing with combustibles.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.
Use only outdoors or in well-ventilated area.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
Collect spillage.
Store away from combustibles.
Store locked up.
Store container tightly closed in well-ventilated place.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Hypochlorite	7778-54-3	>65%	
Calcium Hydroxide	1305-62-0	<2%	
Calcium Carbonate	471-34-1	<2%	
Calcium Chlorate	10137-74-3	<2%	

Common Name and Synonyms	Hypochlorous Acid, Calcium Salt; Losantin; Calcium Hypochloride; Chlorinated lime

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 with gentle stream of water for at least 15 minutes. 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	Immediately give large amounts of water. Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. Harmful or fatal if swallowed.
Additional Information	Not Available

Section 05 - Fire Fighting Measures

Suitable Extinguishing Media	Drench with large quantities of water only.
Unsuitable Extinguishing Media	Do not use dry chemicals or foams. Product supplies own oxygen, therefore attempts to smother fire with a wet blanket, carbon dioxide, dry chemical extinguisher or other means are not effective. Product has the potential to cause a violent reaction if dry chemical fire extinguishers are used.

Specific Hazards Arising From the Chemical	However, calcium hypochlorite is a strong oxidizing agent (can support combustion) and can increase the risk of fire or the intensity of a fire. Calcium hypochlorite can undergo accelerated decomposition with the release of significant amounts of heat, chlorine and oxygen, forming an oxygen-rich atmosphere. The heat from the decomposition of calcium hypochlorite combined with an oxygen-rich atmosphere can cause flammable materials to ignite. Calcium hypochlorite is a serious fire and explosion hazard when contaminated with or comes in contact with oxidizable, combustible materials (e.g. cloth, greases, leather, oils and solvents, paper, sawdust, rubber, plastics and wood). In these situations, there may be spontaneous ignition and explosion. It decomposes explosively under intense fire conditions and closed containers may rupture violently due to rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time. During a fire, corrosive chlorine and hydrogen chloride gases may be generated
Special Protective Equipment for Fire-Fighters	Wear NIOSH-approved self-contained breathing apparatus and protective clothing. Product decomposes at approximately 170-180^{o}C which releases oxygen.
Further Information	Not Available

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Use extreme caution in handling spilled material. Use spark-proof tools and explosion-proof equipment. Do not mix with any other chemicals. Contamination with moisture, acids, organics or other easily combustible materials such as petroleum, paint products, wood or paper may cause fire or violent decomposition.
Environmental Precautions	Prevent material from entering sewers or confined spaces.
Methods and Materials for Containment and Cleaning Up	If fire or decomposition occurs in area of spill, immediately douse with plenty of water. Otherwise, sweep up all visible material using a clean (new, if possible), dry shovel and broom and dissolve material in water. Spilled material that has been swept up and dissolved in water should be used immediately in the normal application for which this product is being consumed.

Section 07 - Handling and Storage

Precautions for Safe Handling	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.

Conditions for Safe Storage

Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials such as combustible and flammable products. Keep out of the sun. Keep product packaging clean and free from contact including other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

Incompatibilities

Highly reactive or incompatible with the following materials: acids, reducing agents, combustible materials such as wood, cloth, or organic materials, dry powder fire extinguishers containing monoammonium phosphate, metals such as iron and copper and their alloys, water or steam, ammonia, urea, amines.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Chlorine	ACGIH	TWA	0.5mg/m^3
	ACGIH	STEL	1.0mg/m^3
	OSHA	TWA	0.5mg/m^3
	OSHA	STEL	1.0mg/m^3
Calcium hydroxide	ACGIH	TWA	5mg/m^3
	OSHA	TWA	5mg/m^3
Calcium Carbonate, total dust	ACGIH	TWA	10mg/m^3
	OSHA	PEL	15mg/m^3

Engineering Control(s)

Ventilation Requirements

Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other

Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face

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.

Hand Protection

Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.
Respiratory Protection	Use NIOSH-approved respirator - full facepiece with chlorine and dust/mist cartridges when dust is present. A self-contained breathing apparatus should be used for major spills.
Thermal Hazards	Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid
Colour	White
Odour	Slight chlorine odour
Odour Threshold	Not Available

Property

pH	11.5 (5% aqueous solution)
Melting Point/Freezing Point	100℃
Initial Boiling Point and Boiling Range	Not Applicable
Flash Point	Not Applicable
Evaporation Rate	Not Available
Flammability	Product is not known to be flammable, combustible, or pyrophoric. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. This product is a strong oxidizer which is capable of intensifying a fire once started. Container may rupture.
Upper Flammable Limit	Not Applicable

Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Not Applicable
Vapour Density (Air=1)	Not Applicable
Relative Density	Not Available
Solubility(ies)	217g/L at 27℃ in water
Partition Coefficient: n-octanol/water	Not Available
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	170-180℃
Viscosity	Not Available
Explosive Properties	Not sensitive to mechanical impact or static discharge.
Specific Gravity (Water=1)	2.35 at 20℃
% Volatiles by Volume	Not Available
Formula	$Ca(OCl)_2$
Molecular Weight	142.98

Section 10 - Stability and Reactivity

Reactivity	Reacts with water and with acids releasing chlorine. Forms explosive compounds with ammonia and amines. Strong oxidizer.
Stability	Stable in optimum storage conditions. Heat, sunlight and contamination could cause decomposition. Product decomposes at approximately 170-180℃ releasing oxygen gas and some chlorine gas. Heating may cause fire or explosion.
Possibility of Hazardous Reactions	Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include contact with combustible materials or contact with acids/ammonia. Reactions may include risk of causing or intensifying fire and/or liberation of toxic gas.
Conditions to Avoid	Heat, flame. Moisture, dusting, sources of ignition and shock, and incompatibles.

Incompatible Materials

Highly reactive or incompatible with the following materials: acids, reducing agents, combustible materials such as wood, cloth, or organic materials, dry powder fire extinguishers containing monoammonium phosphate, metals such as iron and copper and their alloys, water or steam, ammonia, urea, amines.

Hazardous Decomposition Products

Water in contact with calcium hypochlorite releases chlorine gas. Contact with incompatibles presents an explosion and fire hazard. Toxic or corrosive fumes may be liberated. These include chlorine gas.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	LC_{50}
Calcium Hypochlorite	850mg/kg (rat)	>1000mg/kg (rabbit)	No mortalilty at 3.5mg/L (inhalation, rat) (1 hour exposure time)
Calcium Hydroxide	7340mg/kg (rat) 7300 (mouse)	Not Available	Not Available
Calcium Carbonate	6450mg/kg (rat)	Not Available	Not Available

Chronic Toxicity – Carcinogenicity

Component	IARC
Calcium Hypochlorite	Group 3: Not classifiable to its carcinogenicity to humans.

Skin Corrosion/Irritation

Calcium hypochlorite is corrosive to the skin.

Serious Eye Damage/Irritation

Calcium hypochlorite is corrosive to the eyes.

Ingestion

Ingestion can cause burning of the mouth and throat. Product can be fatal if swallowed.

Inhalation

Dust and mist irritate the nose and throat. In confined areas, mechanical agitation can result in high levels of dust, and reaction with incompatibles materials (acids and water/moisture) can result in high concentrations of chlorine vapour, either of which may result in burns to the respiratory tract, producing lung edema, shortness of breath, wheezing, choking, chest pains, impairment of lung function, and possible permanent lung damage.

Respiratory or Skin Sensitization

This material is not known or reported to be a skin or respiratory sensitizer.

Germ Cell Mutagenicity

Results in laboratory analysis show it is not a mutagen.

Reproductive Toxicity	Not reported to show reproductive toxicity.
STOT-Single Exposure	Severely irritating to respiratory system.
STOT-Repeated Exposure	Not Available
Aspiration Hazard	Calcium Hypochlorite can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
Synergistic Materials	Not Available

Section 12 - Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium Hypochlorite	Not Available	LC_{50}(bluegill,96 hour): 0.088mg/L LC_{50}(Lepmis macrochirus, 96hr): 0.057mg/L	EC_{50}(Daphnia magna, 48hr):0.067mg/L
Sodium Chloride	Not Available	LC_{50}(bluegill, 96hr): 1294.6mg/L	EC_{50}(daphnia magna, 48hr): 402.6-469.2mg/L
Calcium Hydroxide	Not Available	LC_{50}(guppy, 96hr): 256mg/L	Not Available

Biodegradability	Not Available
Bioaccumulation	Not Available
Mobility	Not Available
Other Adverse Effects	Not Available

Section 13 - Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

UN Number	UN 2880
UN Proper Shipping Name	Calcium Hypochlorite, Hydrated
Transport Hazard Class(es)	5.1
Packaging Group	II
Environmental Hazards	
Special Precautions	
Transport in Bulk	

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

Section 16 - Other Information

Preparation Date	July 21, 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.

CACD
RESPONSIBILITY MATTERS

Attention: Receiver of the chemical goods / SDS 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 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 center or technical service department.

References

1) Axiall, LLC. (2013, May 8). Material Safety Data Sheet: Calcium Hypochlorite Tablets. Atlanta, GA, USA.
2) *Calcium hypochlorite.* (2004, April 23). Retrieved from Inchem: http://www.inchem.org/documents/sids/sids/7778543.pdf
3) *CHEMINFO: Calcium hypochlorite.* (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/100E.html
4) *Material Safety Data Sheet.* (2011, July 22). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb.ccohs.ca/msds/pdf/anachem/6087077.pdf
5) Sigma-Aldrich. (2012, November 30). Material Safety Data Sheet: Calcium hypochlorite. Oakville, ON.

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Alternative Phone: 1(800) 387-7503
Fax: 1(888) 281-8109

www.ClearTech.ca

Location	Address	Postal Code	Phone Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1(800)387-7503
Port Coquitlam, B.C.	223 Kingsway Avenue	V3C 1S9	1(800)387-7503
Calgary, AB.	5516E - 40th St. S.E.	T2C 2A1	1(800)387-7503
Edmonton, AB.	12020 - 142nd Street	T5L 2G8	1(800)387-7503
Saskatoon, SK.	North Corman Industrial Park	S7K 1V7	1(800)387-7503
Regina, SK.	555 Henderson Drive	S42 5X2	1(800)387-7503
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1(800)387-7503
Mississauga, ON.	355 Admiral Blvd Unit #1	L5T 2N1	1(800)387-7503

24 Hour Emergency Number - All Locations – 1(306) 664-2522
Alternative - 1(800) 387-7503

End of Safety Data Sheet

CACD
RESPONSIBILITY MATTERS

Safety Data Sheet

Section 01 - Identification

Product Identifier	Pro Chlor® Tablets [Calcium Hypochlorite]
Other Means of Identification	ClearTech Industries Inc.
Product Use and Restrictions on Use	Disinfection/sanitizer for potable water, wastewater, industrial processing and cooling water.
Initial Supplier Identifier	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	Phone: 1 (306) 664 – 2522 Alternative Phone: 1 (800) 387-7503

Section 02 - Hazard Identification

GHS-Classification

Acute Toxicity-Oral	Category 4
Skin Corrosion/Irritation	Category 1A
Serious Eye Damage/Eye Irritation	Category 1
STOT-Single Exposure	Category 3
Acute Aquatic Toxicity	Category 1

Signal Word
Danger

Hazard Statements
Harmful if swallowed.

Causes severe skin burns and eye damage.
Causes serious eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

Physical Hazards

Oxidizing Solids Category 2

Signal Word
Danger

Hazard Statement
May intensify fire; oxidizer.

Pictograms

Precautionary Statements
Keep away from heat.
Wear protective gloves and eye/face protection.
Take any precaution to avoid mixing with combustibles.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.
Use only outdoors or in well-ventilated area.
Do not breathe dust or mist.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
Collect spillage.
Store away from combustibles.
Store locked up.
Store container tightly closed in well-ventilated place.

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Calcium Hypochlorite	7778-54-3	65-70%	Not Available
Sodium Chloride	7647-14-5	10-20%	Not Available
Calcium Chlorate	10137-74-3	0-5%	Not Available

Calcium Chloride	10043-52-4	0-5%	Not Available
Calcium Hydroxide	1305-62-0	0-4%	Not Available
Calcium Carbonate	471-34-1	0-5%	Not Available
Water	7732-18-5	5.5-10%	Not Available

NOTE: Available chlorine 70% min.

Common Name and Synonyms Calcium hypochlorite tablets; cal hypo tabs; bleaching powder; calcium chlorohydrochlorite; calcium oxychloride; Ca(OCl)2; chloride of lime; hypochlorous acid, calcium salt; lime chloride.

Section 04 - First Aid Measures

Inhalation

Can release corrosive chlorine gas. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the buddy system). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Avoid mouth-to-mouth contact by using mouth guards or shields. Immediately transport victim to an emergency care facility.

Skin Contact / Absorption

Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, flush contaminated area with lukewarm, gently flowing water for at least 20-30 minutes, or until the chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). If irritation persists, repeat flushing. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Immediately transport victim to an emergency care facility. Discard contaminated clothing, shoes and leather goods.

Eye Contact

Contact lenses should never be worn when working with this product.

Avoid direct contact. Wear chemical protective gloves, if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, by the clock, while holding the eyelid(s) open. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Quickly transport victim to an emergency care facility.

Ingestion

NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water to dilute material in stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Avoid mouth-to-mouth contact by using mouth guards or shields. Quickly transport victim to an emergency care facility.

Additional Information	Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact. Some recommendations in the above sections may be considered medical acts in some jurisdictions. These recommendations should be reviewed with a doctor and appropriate delegation of authority obtained, as required All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

Section 05 - Fire Fighting Measures

Suitable Extinguishing Media	Calcium hypochlorite does not burn. Extinguish fire using extinguishing agents suitable for the surrounding fire and not contraindicated for use with calcium hypochlorite. Calcium hypochlorite is an oxidizing agent. Therefore, flooding quantities of water spray or fog should be used to fight fires involving calcium hypochlorite.
Unsuitable Extinguishing Media	DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed. DO NOT use carbon dioxide, dry chemical powder or other extinguishing agents that smother flames, since they are not effective in extinguishing fires involving oxidizers.
Specific Hazards Arising From the Chemical	Calcium hypochlorite can undergo accelerated decomposition with the release of significant amounts of heat, chlorine and oxygen, forming an oxygen-rich atmosphere. The heat from the decomposition of calcium hypochlorite combined with an oxygen-rich atmosphere can cause flammable materials to ignite. Fires and explosions involving calcium hypochlorite have occurred. Calcium hypochlorite is a serious fire and explosion hazard when contaminated with or comes in contact with oxidizable, combustible materials (e.g. cloth, greases, leather, oils and solvents, paper, sawdust, rubber, plastics and wood). In these situations, there may be spontaneous ignition and explosion. It decomposes explosively under intense fire conditions and closed containers may rupture violently due to rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time. Combustion and thermal decomposition products include: chlorine, hydrogen chloride gas, oxygen gas and calcium oxides.
Special Protective Equipment and Precautions for Fire-Fighters	Product decomposes at approximately 170-180^{o}C releasing oxygen gas. Container may rupture. Fire-fighters must wear NIOSH approved, pressure demand, self-contained breathing apparatus with full face piece for possible exposure to hazardous gases. Emits toxic fumes under fire conditions. If possible, isolate materials not involved in the fire, if this can be done without risk, and protect personnel. If calcium hypochlorite is not involved in the fire, move calcium hypochlorite containers from the fire area only if they have not been exposed to heat. DO NOT get water inside containers. Remove all flammable and combustible materials from the vicinity, especially oil and grease. Do not direct water directly on leak as this may cause leak to increase.

Further Information	The decomposition products of calcium hypochlorite, such as chlorine and hydrogen chloride are extremely hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective equipment (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit and positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Use extreme caution in handling spilled material. Use spark-proof tools and explosion-proof equipment. Restrict access to area until completion of cleanup. Ensure cleanup is conducted by trained personnel only. Wear adequate personal protective equipment. Assume spilled material to be contaminated and therefore a fire hazard. Remove all sources of flammable and combustible materials. Ventilate area. Notify government environmental and occupational health and safety agencies. Do not mix with any other chemicals. Contamination with moisture, acids, organics or other easily combustible materials such as petroleum, paint products, wood or paper may cause fire or violent decomposition.
Environmental Precautions	Stop or reduce leak if safe to do so and prevent from entering sewers, waterways, or confined spaces. Notify government occupational health and safety and environmental authorities. Chlorine is highly toxic to all forms of aquatic life.
Methods and Materials for Containment and Cleaning Up	DANGER: All spills of this product should be treated as contaminated. Contaminated product may initiate a chemical reaction that may spontaneously ignite any combustible material present, resulting in a fire of great intensity. In case of a spill, separate all spilled product from packaging, debris and other material. Using a clean broom or shovel, place all spilled product into plastic bags, and place those bags into a clean, dry disposal container, properly marked and labeled. Disposal containers made of plastic or metal are recommended. Do not seal disposal containers tightly. Immediately remove all product in disposal containers to an isolated area outdoors. Place all damaged packaging material in a disposal container of water to assure decontamination (i.e. removal of all product) before disposal. Place all undamaged packaging in a clean, dry container properly marked and labeled.

Section 07 - Handling and Storage

Precautions for Safe Handling	This material is a MODERATE to STRONG OXIDIZER and is CORROSIVE (EYES AND SKIN). Calcium hypochlorite solid and solutions also release corrosive chlorine gas. 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 only a clean, dry scoop made of metal or plastic each time product is taken from the container. Do not add this product to any dispensing devise containing remnants of any other product. Such use may cause violent reaction leading to fire or explosion. Add this product to water; NEVER add water to product. Always add the product to large quantities of water. May cause fire or explosion if mixed with other chemicals. Do not reuse container. Residual material remaining in empty container can react to cause fire.

Conditions for Safe Storage

Keep product tightly sealed in original containers. Store product in a cool, dry, well-ventilated area. Store away from combustible or flammable products. Keep product packaging clean and free of all contamination, including, e.g. other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

Do not store product where the average daily temperature exceeds 35°C / 95°F. Storage above this temperature may result in rapid decomposition, evolution of chlorine gas and heat sufficient to ignite combustible products. Shelf life (that is, the period of time before the product goes below stated label strength) is determined by storage time and temperatures. Store in a cool, dry and well-ventilated area. Prolonged storage at elevated temperatures will significantly shorten the shelf life. Storage in a climate controlled storage area or building is recommended in those areas where extremes of high temperature occur.

See section 10 for a more complete list of incompatibles.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Calcium Hypochlorite	ACGIH	TLV-TWA	Not Established
Chlorine	ACGIH	TLV-TWA	0.5 ppm
	ACGIH	TLV-STEL	1.0 ppm
	OSHA	PEL-T-C	1 ppm (3 mg/m^3)
Sodium Chloride	ACGIH & OSHA	TLV-TWA & PEL-T-TWA	Not established.
Calcium Chlorate	ACGIH & OSHA	TLV-TWA	Not Established
Calcium Chloride	ACGIH & OSHA	TLV-TWA & PEL-T-TWA	Not established.
Calcium hydroxide	ACGIH	TLV-TWA	5 mg/m^3
	OSHA	PEL-T-TWA	5 mg/m^3 (respirable fraction)
Calcium Carbonate	ACGIH	TLV-TWA	Not Established
	OSHA	PEL-T-TWA	15 mg/m^3 (respirable fraction)

Engineering Control(s)

Ventilation Requirements

Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other

Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face	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.
Hand Protection	Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
Skin and Body Protection	Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse. Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.

Respiratory Protection

No specific guidelines are available. Contact the material manufacturer or supplier for specific advice. Solutions of calcium hypochlorite release corrosive chlorine gas at normal temperatures. The solid material also decomposes to release chlorine gas. Consult the CHEMINFO review of chlorine for information regarding respirator recommendations.

For chlorine from the CCOHS CHEMINFO:

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-11, "Selection, Use, and Care of Respirators", available from the Canadian Standards Association.

Wear NIOSH-approved self-contained breathing apparatus and protective clothing.

NOTE: Substance reported to cause eye irritation or damage; may require eye protection.

NIOSH RECOMMENDATIONS FOR CHLORINE CONCENTRATIONS IN AIR:
Up to 5 ppm:
(APF = 10) Chemical cartridge respirator; SAR.

Up to 10 ppm:
(APF = 25) SAR operated in a continuous-flow mode; Powered, air-purifying respirator with cartridge(s).
(APF = 50) Chemical cartridge respirator with a full facepiece and cartridge(s); Air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister; SCBA with a full facepiece; Full facepiece SAR.

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode; SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister;
Any appropriate escape-type SCBA.

NOTE: The IDLH concentration for chlorine is 10 ppm. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory protection equipment.

The respirator use limitations specified by the approving agency and the manufacturer must be observed. Recommendations apply only to NIOSH approved respirators. Air-purifying respirators do not protect against oxygen-deficient atmospheres.

Thermal Hazards

Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State	Solid
Colour	White
Odour	Slight chlorine odour
Odour Threshold	Not Available

Property

pH	Alkaline
Melting Point/Freezing Point	100℃
Initial Boiling Point and Boiling Range	Product decomposes at approximately 170-180^{o}C
Flash Point	Not combustible (does not burn).
Evaporation Rate	Not Available
Flammability	Calcium hypochlorite is not combustible (does not burn). However, calcium hypochlorite is a strong oxidizing agent (can support combustion) and can increase the risk of fire or the intensity of a fire. Calcium hypochlorite will not accumulate static charge. Container may rupture during a fire or with excessive heat.
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20^{o}C)	Not Applicable. Does not form vapour.
Vapour Density (Air=1)	Not Applicable
Bulk Density	67-71 (kg/m^{3})
Solubility(ies)	217g/L at 27℃ in water
Partition Coefficient: n-octanol/water	Not Available

Auto-ignition Temperature	Not Applicable
Decomposition Temperature	170-180℃
Viscosity	Not Applicable
Explosive Properties	Not sensitive to mechanical impact or static discharge.
Specific Gravity (Water=1)	2.35
% Volatiles by Volume	Not Available
Formula	$Ca(ClO)_2$
Molecular Weight	142.98 g/mol

Section 10 - Stability and Reactivity

Reactivity	The NFPA lists calcium hypochlorite (50 percent or less by weight) as a Class 2 Oxidizer and calcium hypochlorite (over 50 percent by weight) as a Class 3 Oxidizer. NFPA defines an oxidizer as any material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and can undergo a vigorous self-sustained decomposition due to contamination or heat exposure. NFPA rates oxidizers on a scale of Class 4 to Class 1, with Class 4 being the most severe and Class 1 the least severe. Class 2 Oxidizers cause a moderate increase in the burning rate of combustible materials with which they come into contact. Class 3 Oxidizers cause a severe increase in the burning rate of combustible materials with which they come into contact. Reacts with water and with acids releasing chlorine. Forms explosive compounds with ammonia and amines. Strong oxidizer.
Stability	Inherently unstable. The rate of decomposition of the pure, dry material is extremely low at room temperature. Decomposition is accelerated in the presence of small amounts of water, moist air, carbon dioxide (also present in the air) and/or the presence of contaminants (e.g. rust from container corrosion or the use of a contaminated scoop). When it decomposes, the vigorous reaction generates a great deal of heat, oxygen and very corrosive chlorine gas. Heat, sunlight and contamination could cause decomposition. Product decomposes at approximately 170-180℃ releasing oxy gen gas and some chlorine gas [unstable above 170℃] . Heating may cause fire or explosion.

Possibility of Hazardous Reactions

Hazardous reactions or instability may occur under certain conditions of storage or use. Conditions may include contact with combustible materials or contact with acids/ammonia. Reactions may include risk of causing or intensifying fire and/or liberation of toxic gas.

Small quantities will not usually undergo self-heating or spontaneous ignition under normal conditions of storage and handling. However, small quantities may spontaneously ignite, either through self-heating due to decomposition or due to the presence of contaminants. Self-heating materials can eventually ignite through progressive accelerating decomposition if they are stored or processed above the Self Accelerating Decomposition Temperature (SADT). The SADT varies with quantity and moisture content. The decomposition temperature is much lower for bulk quantities than for small quantities. For example, the SADT of bulk quantities (20 foot container packed with 200 kg drums) can be as less than 30℃ C. A single 50 kg drum can have a SADT of 77-80℃.

When small amounts of water are present, calcium hypochlorite has been reported to decompose to dichlorine monoxide, oxygen, chlorine and chlorine compounds. Dichlorine monoxide is not formed when water is in excess. Dichlorine monoxide is a dangerous, unstable compound, which can decompose explosively when heated, exposed to light, by friction, shock, or a static spark. It has been suggested that some of the hazardous reactions of calcium hypochlorite may have been initiated by traces of dichlorine monoxide.

Conditions to Avoid

Excessive above heat 170℃, flame, sunlight. Moistu re, dusting, sources of ignition and shock, and incompatibles.

Incompatible Materials

Water or steam.
Flammable and combustible materials (e.g. grease, oils, fat, paper, straw, wood, cloth, sugars, organic materials) - readily ignite in contact with anhydrous (dry) calcium hypochlorite. Addition of 16-22% water will prevent this. Anhydrous calcium hypochlorite may undergo self-sustained decomposition when initiated by a lit cigarette or organic contamination. The normal commercial product contains 6-12% moisture to stabilize it against decomposition.
Ammonia, primary amines (e.g. ethylamine), aromatic amines (e.g. aniline) and Urea - react to form explosively unstable N-mono- or di-chloramines.
Acids (especially hydrochloric acid) - contact releases corrosive chlorine gas.
Ammonium chloride - forms explosive nitrogen trichloride.
Ethanol or methanol - may explode due to the formation of the alkyl hypochlorites.
Hydroxy compounds (e.g. ethanediol (ethylene glycol), glycerol, diethylene glycol monomethyl ether, polyethylene glycol, or phenol) - contact causes ignition and may explode.
Acetlyene - contact of acetylene with calcium hypochlorite or bleaching powder may read to formation of explosive chloroacetylenes.
Acetic acid and potassium cyanide - can explode.
Reducing agents (e.g. hydrides, such as lithium aluminum hydride) - cause a violent reaction.
Metal oxides (e.g., iron (rust), nickel, copper and their alloys, cobalt or magnesium oxides) - can cause violent oxygen-evolving decomposition of hypochlorites.
Charcoal - a confined intimate mixture of calcium hypochlorite and finely divided charcoal exploded on heating.
Metals (especially cobalt, copper, nickel and manganese) - catalyze the decomposition of calcium hypochlorite.
Organic sulphur compounds - (e.g. organic thiols, such as 1-propanethiol and isobutanethiol, or sulfides) - may cause a violent reaction and flash fire and/or explosion.
Sulphur - a mixture of damp sulfur and solid 'swimming pool chlorine' caused a violently exothermic reaction, and ejection of molten sulfur.
Turpentine - can explode.
Extinguishers containing dry powder monoammonium phosphate.

Hazardous Decomposition Products

Water in contact with calcium hypochlorite releases chlorine gas. Contact with incompatibles presents an explosion and fire hazard. Toxic or corrosive fumes may be liberated. These include chlorine gas.
Acid or ammonia contamination will release toxic gases. Excessive heat will cause decomposition resulting in the release of oxygen and chlorine gas.
Chlorine, oxygen, dichlorine monoxide, calcium chlorate, calcium hydroxide, calcium carbonate.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Calcium Hypochlorite	850mg/kg (rat)	>2000mg/kg (rabbit)	No mortality at 3.5mg/L (rat) (1 hour exposure time)
Sodium Chloride	3000mg/kg (rat)	Not Available	Not Available
Calcium Chlorate	4500mg/kg (rat)	Not Available	Not Available
Calcium Chloride	755mg/kg (rabbit)	Not Available	Not Available
Calcium Hydroxide	7340mg/kg (rat) 7300 (mouse)	Not Available	Not Available
Calcium Carbonate	6450mg/kg (rat)	Not Available	Not Available

Chronic Toxicity – Carcinogenicity

Component	IARC
Calcium Hypochlorite	Group 3: Not classifiable to its carcinogenicity to humans.

Skin Corrosion/Irritation

Calcium hypochlorite is corrosive to the skin.

Serious Eye Damage/Irritation

Calcium hypochlorite is corrosive to the eyes.

Ingestion

Ingestion can cause burning of the mouth and throat. Product can be fatal if swallowed.

Inhalation

Inhalation of Calcium Hypochlorite dust and deposition of particles in the respiratory tract can lead to irritation of the tissue and cause a variety of effects. These effects are dependent on concentration and include: upper respiratory tract irritation, nasal congestion, coughing, sore throat, laryngitis and shortness of breath. In operations where there are high concentrations of respirable particles, pulmonary edema (fluid in the lung) may be produced. If not treated immediately, pulmonary edema can be life threatening. Dust and mist irritate the nose and throat. In confined areas, mechanical agitation can result in high levels of dust, and reaction with incompatibles materials (acids and water/moisture) can result in high concentrations of chlorine vapour, either of which may result in burns to the respiratory tract, producing lung edema, shortness of breath, wheezing, choking, chest pains, impairment of lung function, and possible permanent lung damage.

Respiratory or Skin Sensitization

This material is not known or reported to be a skin or respiratory sensitizer.

Germ Cell Mutagenicity

There is no human information available and there are no studies using live animals available. Calcium hypochlorite was mutagenic in bacteria and cultured mammalian cells.

Reproductive Toxicity

There is no human or animal information available for calcium hypochlorite.

STOT-Single Exposure	Severely irritating to respiratory system.
STOT-Repeated Exposure	Not Available
Aspiration Hazard	Calcium Hypochlorite can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
Synergistic Materials	Not Available

Section 12 - Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Calcium Hypochlorite	EC_{50}(Pseudokirchneriella subcapitata(green algae), 72 hr): 0.983mg/L	LC_{50}(Lepomis macrochirus(Bluegill),96hr): 0.057mg/L	EC_{50}(Daphnia magna, 48hr):0.073mg/L
Sodium Chloride	Not Available	LC_{50}(Gambusia affinis(Western mosquitofish), 96hr): 17550mg/L	EC_{50}(Ceriodaphnia dubia, 48hr):2122.55mg/L
Calcium Chlorate	Not Available	Not Available	Not Available
Calcium Chloride	Not Available	LC_{50}(Pimphales promelas, 96hr): 4630mg/L	EC_{50}(Daphnia magna, 48hr): 2770 mg/L
Calcium Hydroxide	EC_{50}(Aphanizomenon flos-aquae(Blue-green algae), 22hr): 84mg/L	LC_{50}(Gambusia affinis(Western mosquitofish), 96hr): 160mg/L	LC_{50}(Crangon septemspinosa(Bay shrimp, Sand shrimp), 96hr: 158mg/L
Calcium Carbonate	Not Available	LC_{50}(Gambusia affinis(Western mosquitofish), 24-96hr): >56000mg/L	Not Available

Biodegradability	Product not biodegradable. Chlorine can however, be converted to chloride by reducers in natural environment. Presence of light will accelerate dissipation of chlorine in water.
Bioaccumulation	Chlorine is highly toxic to all forms of aquatic life, there is no potential for bioaccumulation or bioconcentration.
Mobility	Not Available
Other Adverse Effects	Not Available

Section 13 - Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

UN Number	UN 2880
UN Proper Shipping Name	CALCIUM HYPOCHLORITE, HYDRATED with not less than 5.5 per cent but not more than 10 per cent water.
Transport Hazard Class(es)	5.1
Packaging Group	II
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations Schedule 1, Column 10.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 16 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

NSF Certification…… Product is certified under NSF/ANSI Standard 60 for disinfection, oxidation and as an algicide at a maximum dosage of 15 mg/L.

Section 16 - Other Information

Preparation Date January 19, 2015

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 / SDS 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 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 center or technical service department.

References

1) Global Water Treatment Chemicals [GWTC]. (2014, February 20). Material Safety Data Sheet: Pro Chlor Tablets. Weatherford, TX, USA.

2) CHEMINFO: Calcium hypochlorite. (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/100E.html

3) HSDB: Calcium hypochlorite. (2014). Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/914.html#TOC3B

4) CHRIS: Calcium hypochlorite. Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb.ccohs.ca/chris/records/229.html

5) CHEMINFO: Chlorine. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/85E.html

6) CHEMINFO: Calcium chlorate. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/3331E.html

7) HSDB: Calcium chlorate. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/253.html

8) CHEMINFO: Calcium hydroxide. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/10E.html

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9) HSDB: Calcium hydroxide. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/919.htmll#TOC6

10) CHEMINFO: Calcium carbonate. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/26E.html

11) HSDB: Calcium carbonate. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/927.html#TOC6

12) CHEMINFO: Sodium chloride. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/332E.html

13) HSDB: Sodium chloride. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/6368.html

14) CHEMINFO: Calcium chloride. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/cheminfo/records/726E.html

15) HSDB: Calcium chloride. (2014) Retrieved from Canadian Centre for Occupational Health and Safety: http://ccinfoweb2.ccohs.ca/hsdb/records/923.html

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Alternative Phone: 1(800) 387-7503
Fax: 1(888) 281-8109

www.ClearTech.ca

Location	Address	Postal Code	Phone Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	1(800)387-7503
Port Coquitlam, B.C.	223 Kingsway Avenue	V3C 1S9	1(800)387-7503
Calgary, AB.	5516E - 40th St. S.E.	T2C 2A1	1(800)387-7503
Edmonton, AB.	12020 - 142nd Street	T5L 2G8	1(800)387-7503
Saskatoon, SK.	North Corman Industrial Park	S7K 1V7	1(800)387-7503
Regina, SK.	555 Henderson Drive	S42 5X2	1(800)387-7503
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	1(800)387-7503
Mississauga, ON.	355 Admiral Blvd Unit #1	L5T 2N1	1(800)387-7503

CACD
RESPONSIBILITY MATTERS

24 Hour Emergency Number - All Locations – 1(306) 664-2522
Alternative - 1(800) 387-7503

End of Safety Data Sheet

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Shell Paraffinic Oil X409

Product code : Q6564

Manufacturer or supplier's details

Company : **Shell Chemicals Canada**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada
Telephone : 1-855-697-4355
Telefax : 1-866-213-7508

Emergency telephone number

CHEMTREC (24 hr) : 1-800-424-9300
Canutec (24 hr) : 1-613-996-6666

Recommended use of the chemical and restrictions on use

Recommended use : Solvent.

Restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

Prepared by : Shell Product Stewardship

SECTION 2. HAZARDS IDENTIFICATION

WHMIS Classification : : THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

Other hazards which do not result in classification

May form flammable/explosive vapour-air mixture.
This material is a static accumulator.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Repeated exposure may cause skin dryness or cracking.

Potential Health Effects

Primary Routes of Entry : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.

Skin	:	No specific hazards under normal use conditions. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
Eyes	:	No specific hazards under normal use conditions.
Ingestion	:	May be fatal if swallowed and enters airways.
Symptoms of Overexposure	:	If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.

Environmental Effects

Environmental Effects	:	Not classified as dangerous for the environment.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

WHMIS controlled ingredients

Chemical Name	CAS-No.	Concentration [%]
Alkanes, C15-19-branched and linear	1437281-01-0	100

SECTION 4. FIRST-AID MEASURES

General advice	:	Not expected to be a health hazard when used under normal conditions.
If inhaled	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
In case of skin contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
In case of eye contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
If swallowed	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of

breath, chest congestion or continued coughing or wheezing.

Most important symptoms and effects, both acute and delayed	:	If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
Protection of first-aiders	:	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Immediate medical attention, special treatment	:	Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	:	Do not use water in a jet.
Specific hazards during firefighting	:	Clear fire area of all non-emergency personnel. Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water.
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Keep adjacent containers cool by spraying with water.
Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.

Local authorities should be advised if significant spillages cannot be contained.

: Avoid contact with skin, eyes and clothing.
Isolate hazard area and deny entry to unnecessary or unprotected personnel.
Do not breathe fumes, vapour.
Do not operate electrical equipment.

Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Monitor area with combustible gas indicator.

Methods and materials for containment and cleaning up : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Ventilate contaminated area thoroughly.
If contamination of site occurs remediation may require specialist advice.

Additional advice : For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet.

SECTION 7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Precautions for safe handling	:	Avoid inhaling vapour and/or mists. Avoid contact with skin, eyes and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Bulk storage tanks should be diked (bunded). When using do not eat or drink. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Avoidance of contact	:	Strong oxidising agents.
Product Transfer	:	Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Refer to guidance under Handling section.

Storage

Conditions for safe storage, including any incompatibilities	:	Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.
Other data	:	Storage Temperature: Ambient. Bulk storage tanks should be diked (bunded). Locate tanks away from heat and other sources of ignition. Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions. Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat. Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment. Electrostatic charges will be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.

The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material	:	Suitable material: For containers, or container linings use mild steel, stainless steel., For container paints, use epoxy paint, zinc silicate paint. Unsuitable material: Avoid prolonged contact with natural, butyl or nitrile rubbers.
Container Advice	:	Do not cut, drill, grind, weld or perform similar operations on or near containers.
Specific use(s)	:	Not applicable

See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

None established.

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Appropriate engineering controls	:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select

controls based on a risk assessment of local circumstances.
Appropriate measures include:
Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Firewater monitors and deluge systems are recommended.
Eye washes and showers for emergency use.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

General Information:
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.
Practice good housekeeping.
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal protective equipment

Protective measures

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
If air-filtering respirators are suitable for conditions of use:
Select a filter suitable for organic gases and vapours [Type A boiling point >65°C (149°F)].

Hand protection

Remarks	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Nitrile rubber gloves. Incidental contact/Splash protection: PVC, neoprene or nitrile rubber gloves For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye protection	:	If material is handled such that it could be splashed into eyes, protective eyewear is recommended.
Skin and body protection	:	Skin protection is not required under normal conditions of use. For prolonged or repeated exposures use impervious clothing over parts of the body subject to exposure. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to relevant Standard, and provide employee skin care programmes. Wear antistatic and flame retardant clothing, if a local risk assessment deems it so.
Thermal hazards	:	Not applicable
Hygiene measures	:	Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not ingest. If swallowed then seek immediate medical assistance.

Environmental exposure controls

General advice	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation. Information on accidental release measures are to be found in

section 6.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquid.
Colour	:	colourless
Odour	:	Hydrocarbon
Odour Threshold	:	Data not available
pH	:	Not applicable
Melting / freezing point	:	Data not available
Boiling point/boiling range	:	260 - 320 °C / 500 - 608 °F
Flash point	:	128.5 °C / 263.3 °F
Upper explosion limit	:	7 %(V)
Lower explosion limit	:	0.5 %(V)
Vapour pressure	:	Data not available
Relative vapour density	:	Data not available
Relative density	:	< 0.8
Density	:	< 800 kg/m3 (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	log Pow: > 7
Auto-ignition temperature	:	> 200 °C / > 392 °F
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	< 2 mm2/s (25 °C / 77 °F)
Explosive properties	:	Classification Code: Not classified
Oxidizing properties	:	Not applicable
Conductivity	:	Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000

pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Chemical stability	:	No hazardous reaction is expected when handled and stored according to provisions Stable under normal conditions of use.
Possibility of hazardous reactions	:	Reacts with strong oxidising agents.
Conditions to avoid	:	Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity.
Incompatible materials	:	Strong oxidising agents.
Hazardous decomposition products	:	Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Information on likely routes of exposure	:	Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Acute toxicity

Product:

Acute oral toxicity	:	LD50 Rat: > 5,000 mg/kg Remarks: Expected to be of low toxicity:
Acute inhalation toxicity	:	Remarks: Expected to be of low toxicity: LC50 greater than near-saturated vapour concentration.

Acute dermal toxicity : LD50 Rabbit: > 2,000 mg/kg
Remarks: Expected to be of low toxicity:

Skin corrosion/irritation

Product:

Remarks: Expected to be non-irritating to skin., Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.

Serious eye damage/eye irritation

Product:

Remarks: Expected to be non-irritating to eyes.

Respiratory or skin sensitisation

Product:

Remarks: Not expected to be a sensitiser.

Germ cell mutagenicity

Product:

Remarks: Not expected to be mutagenic.

Carcinogenicity

Product:

Remarks: Not expected to be carcinogenic.

Material	GHS/CLP Carcinogenicity Classification
Alkanes, C15-19-branched and linear	No carcinogenicity classification.

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

Reproductive toxicity

Product:

Remarks: Not expected to be a developmental toxicant., Not expected to impair fertility.

STOT - single exposure

Product:

Remarks: Not expected to be a hazard.

STOT - repeated exposure

Product:

Remarks: Not expected to be a hazard.

Aspiration toxicity

Product:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Further information

Product:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment	:	Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Ecotoxicity

Product:

Toxicity to fish (Acute toxicity)	:	LL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to crustacean (Acute toxicity)	:	EL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to algae/aquatic plants (Acute toxicity)	:	EL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean (Chronic toxicity)	:	Remarks: Data not available
Toxicity to microorganisms (Acute toxicity)	:	IC50 : > 100 mg/l Remarks: Expected to be practically non toxic:

Persistence and degradability

Product:

Biodegradability	:	Remarks: Expected to be readily biodegradable., Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Product:

Bioaccumulation	:	Remarks: Has the potential to bioaccumulate.
Partition coefficient: n-octanol/water	:	log Pow: > 7

Mobility in soil

Product:

Mobility	:	Remarks: Floats on water., If it enters soil, it will adsorb to soil particles and will not be mobile.

Other adverse effects

no data available

Product:

Additional ecological information	:	Physical properties indicate that hydrocarbon gases will rapidly volatilise from the aquatic environment and that acute and chronic effects would not be observed in practice., Not expected to have ozone depletion potential.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment. 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 and must be complied with.
Contaminated packaging	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer. Comply with any local recovery or waste disposal regulations.

SECTION 14. TRANSPORT INFORMATION

National Regulations

TDG
Not regulated as a dangerous good

International Regulation

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

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

Pollution category	:	Annex I
Ship type	:	Annex I or Double hull vessels with carriage of oil certification
Product name	:	Gas Oil

Special precautions for user

Remarks	:	Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	This product is being carried under the scope of MARPOL Annex I. This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : : THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

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

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

DSL	Listed
ENCS	Listed
KECI	Listed
PICCS	Listed
EINECS	Listed
TSCA	Listed

Other regulations : The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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

SECTION 16. OTHER INFORMATION

Further information

NFPA Rating (Health, Fire, Reactivity) 1, 1, 0

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).

Version 1.1Revision Date 2015-11-24

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **SBP 80/110 LNH**
Uses : Industrial Solvent.
Product Code : Q5411

Manufacturer/Supplier : **Shell Chemicals Canada Ltd.**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada

Telephone : 1-855-697-4355
Fax : 1-866-213-7508

Emergency Telephone Number
CHEMTREC (24 hr) : 1-800-424-9300
Canutec (24 hr) : 1-613-996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Naphtha (petroleum), hydrotreated light
CAS No. : 64742-49-0

WHMIS Controlled Ingredients

Chemical Name	CAS No.	Conc. W/W
n-Hexane	110-54-3	< 5.00 %W

Refer to Chapter 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Health Hazards : Vapours may cause drowsiness and dizziness. Irritating to skin. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Central nervous system (CNS).

Signs and Symptoms : Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

Environmental Hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38,3° C), shortness of breath, chest congestion or continued coughing or wheezing.
Advice to Physician	:	Causes central nervous system depression. Dermatitis may result from prolonged or repeated exposure. Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical -12 °C / 10 °F (IP 170)
Explosion / Flammability limits in air	:	1 - 8 %(V)
Auto ignition temperature	:	367 °C / 693 °F (ASTM E-659)
Hazardous Combustion Products and Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective Measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate

containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Clean Up Methods : For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional Advice : See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Avoid contact with skin, eyes, and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Handle and open container with care in a well-ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains.

Storage : Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment. Bulk storage tanks should be diked (bunded). Storage Temperature: Ambient.

Product Transfer : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.

Unsuitable Materials : Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Additional Information : Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

In the absence of occupational exposure standards for this product, it is recommended that the following are adopted.

Material	Source	Type	ppm	mg/m3	Notation
RCP Aliphatic dearom. solvents 80 - 110	EU HSPA	TWA (8 h)		1,200 mg/m3	
n-Hexane	ACGIH	TWA	50 ppm		
	ACGIH	SKIN_DES			Can be absorbed through the skin.
	CAD SK OEL	8 HR ACL	50 ppm		
	CAD SK OEL	15 MIN ACL	62.5 ppm		
	CAD SK OEL	SKIN_DES			Can be absorbed through the skin.
	CAD SK OEL				Listed.

Consult local authorities for acceptable exposure limits within their jurisdiction.

Additional Information : Adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations

		to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Hand Protection	:	Longer term protection: Nitrile rubber gloves Incidental contact/Splash protection: PVC or neoprene rubber gloves Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Monogoggles (EN166)
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron. Skin protection not ordinarily required beyond standard issue work clothes.
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical property data are typical values and do not constitute a specification.

Appearance	:	Colourless. Liquid.
Odour	:	Paraffinic.
Odour threshold	:	GLC
pH	:	Not applicable
Boiling point	:	Typical 88 - 105 °C / 190 - 221 °F
Pour point	:	< -30 °C / -22 °F
Vapour pressure	:	Typical 4,000 Pa at 0 °C / 32 °F Typical 8,500 Pa at 20 °C / 68 °F Typical 29,000 Pa at 50 °C / 122 °F
Specific gravity	:	Data not available.
Density	:	Typical 714 kg/m3 at 15 °C / 59 °F (ASTM D-4052)
Water solubility	:	Immiscible.
Solubility in other solvents	:	Aliphatics Miscible. Aromatics Miscible.
n-octanol/water partition coefficient (log Pow)	:	3.4 - 5.2
Kinematic viscosity	:	Typical 0.61 mm2/s at 25 °C / 77 °F
Vapour density (air=1)	:	Data not available.
Electrical conductivity	:	0.7 pS/m (ASTM D-4308)
Coefficient of expansion	:	Typical 0.0009 / °C
Dielectric constant		Typical 2
Heat of vapourisation		Typical 320 J/g
Refractive index		Typical 1.397 at 20 °C / 68 °F (ASTM D-1218)
Reaction with water		Not applicable
Specific heat		Typical 2 kJ/kg °C
Saturated Vapour concentration (in air)		335 g/m3 at 20 °C / 68 °F (estimated value(s))

Thermal conductivity		Typical 0.13 W/m °C
Volatile organic carbon content		85 % (EC/1999/13)
Evaporation rate (nBuAc=1)	:	2.9 (DIN 53170, di-ethyl ether=1) 4.2 (ASTM D 3539, nBuAc=1)
Surface tension	:	Typical 21.2 mN/m at 20 °C / 68 °F (ASTM D-971)
Molecular weight	:	99 g/mol
Hygroscopicity	:	Immiscible.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Hazardous Polymerisation	:	Data not available.
Sensitivity to Mechanical Impact	:	Data not available.
Sensitivity to Static Discharge	:	Data not available.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment : Information given is based on product testing, and/or similar products, and/or components.

Oral		LD 50: > 2,000 mg/kg, Rat
Dermal		LD 50: > 2,000 mg/kg, Rat
Inhalation		LC50: > 20 mg/l / 4 hours, Rat

Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 >2000 mg/kg Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 >2000 mg/kg
Acute Inhalation Toxicity	:	Expected to be of low toxicity: LC50 >20 mg/l High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Skin Irritation	:	Causes mild skin irritation.
Eye Irritation	:	Not irritating to eye.
Respiratory Irritation	:	Data not available.
Sensitisation	:	Not a skin sensitiser.
Repeated Dose Toxicity	:	Central nervous system: repeated exposure affects the nervous system. Kidney: caused kidney effects in male rats which are not considered relevant to humans
Mutagenicity	:	Not mutagenic.
Carcinogenicity	:	Not a carcinogen. Tumours produced in animals are not considered relevant to humans.
Reproductive and	:	Not expected to be a developmental toxicant. Not expected to

Developmental Toxicity impair fertility.
Additional Information : Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.

12. ECOLOGICAL INFORMATION

Acute Toxicity

Fish	:	Toxic: LL/EL/IL50 1-10 mg/l
Aquatic Invertebrates	:	Toxic: LL/EL/IL50 1-10 mg/l
Algae	:	Harmful: LL/EL/IL50 10-100 mg/l
Microorganisms	:	Expected to be harmful: LL/EL/IL50 10-100 mg/l
Mobility	:	Floats on water. Adsorbs to soil and has low mobility.
Persistence/degradability	:	Readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	:	Has the potential to bioaccumulate.
Other Adverse Effects	:	None known.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Refer to Section 7 before handling the product or containers. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	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 and must be complied with.

14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification

UN/NA Number	UN 1268
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Class Division	3
Packing group	II
Shipping Description	PETROLEUM DISTILLATES, N.O.S., Class 3, UN 1268, PG II
Emergency Response Guide No	128

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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.

Inventory Status

DSL	:	Listed.	
INV (CN)	:	Listed.	
TSCA	:	Listed.	
EINECS	:	Listed.	265-151-9
KECI (KR)	:	Listed.	KE-25623

16. OTHER INFORMATION

MSDS Version Number	:	1.1
MSDS Effective Date	:	2011-11-14
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this (M)SDS is in accordance with the Controlled Product Regulations.
MSDS Prepared By	:	Shell Product Stewardship; 1-855-697-4355
Uses and Restrictions	:	Industrial Solvent.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Heptane**
Uses : Industrial Solvent.
Product Code : Q1352, Q9231

Manufacturer/Supplier : **Shell Chemicals Canada Ltd.**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada

Telephone : 1-855-697-4355
Fax : 1-866-213-7508

Emergency Telephone Number
CHEMTREC (24 hr) : 1-800-424-9300
Canutec (24 hr) : 1-613-996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Special boiling point spirit
Heptane (commercial)
CAS No. : 64742-89-8

WHMIS Controlled Ingredients

Chemical Name	CAS No.	Conc. W/W
Solvent Naphtha (Petroleum), Light Aliphatic	64742-89-8	100.00 %

Contains n-Heptane, CAS # 142-82-5

Refer to Chapter 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION


WHMIS Class/Description : Class B2 Flammable Liquid
Class D2B Other Toxic Effects - Skin Irritant

Routes of Exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Health Hazards : Vapours expected to be slightly irritating. Vapours may cause drowsiness and dizziness. Irritating to skin. Vapours may be irritating to the eye. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Auditory system.

Signs and Symptoms : Respiratory irritation signs and symptoms may include a

temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.

Aggravated Medical Condition	:	Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Safety Hazards	:	Highly flammable. In use, may form flammable/explosive vapour-air mixture. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.
Environmental Hazards	:	Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38,3° C), shortness of breath, chest congestion or continued coughing or wheezing.
Advice to Physician	:	Causes central nervous system depression. Dermatitis may result from prolonged or repeated exposure. Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical -5 °C / 23 °F (IP 170)
Explosion / Flammability limits in air	:	1 - 7 %(V)
Auto ignition temperature	:	246 - 260 °C / 475 - 500 °F (ASTM E-659)
Hazardous Combustion Products and Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide,

sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.

Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective Measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Clean Up Methods	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
Additional Advice	:	See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Handling	:	Avoid contact with skin, eyes, and clothing. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Handle and open container with care in a well-ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains. Avoid handling above its flashpoint otherwise the product will form flammable/explosive vapour-air mixtures

Storage : Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Storage Temperature: Ambient. Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.

Product Transfer : Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.

Unsuitable Materials : Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

In the absence of occupational exposure standards for this product, it is recommended that the following are adopted.

Material	Source	Type	ppm	mg/m3	Notation
RCP Dearomatised Heptane fraction	EU HSPA	TWA (8 h)		1,400 mg/m3	

Consult local authorities for acceptable exposure limits within their jurisdiction.

Additional Information : Wash hands before eating, drinking, smoking and using the toilet.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.
Respiratory Protection	:	If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Longer term protection: Nitrile rubber gloves Incidental contact/Splash protection: PVC or neoprene rubber gloves Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Chemical splash goggles (chemical monogoggles).
Protective Clothing	:	Use protective clothing which is chemical resistant to this material. Safety shoes and boots should also be chemical resistant.
Monitoring Methods	:	Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods, http://www.osha-slc.gov/dts/sltc/methods/toc.html. Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances, http://www.hsl.gov.uk/publications/mdhs.aspx. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods, http://www.cdc.gov/niosh/nmam/nmammenu.html.
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical property data are typical values and do not constitute a specification.

Appearance	:	Colourless. Liquid.

Odour	:	Paraffinic.
Odour threshold	:	50 - 200 ppm (ASTM 48)
pH	:	Not applicable
Boiling point	:	90 - 100 °C / 194 - 212 °F
Pour point	:	Typical -90 °C / -130 °F
Vapour pressure	:	6 - 7.7 kPa at 20 °C / 68 °F
Specific gravity	:	0.7 - 0.71 at 20 °C / 68 °F
Density	:	Typical 713 kg/m3 at 15 °C / 59 °F (ASTM D-4052)
Water solubility	:	2.6 mg/l at 25 °C / 77 °F Immiscible.
n-octanol/water partition coefficient (log Pow)	:	4.7
Vapour density (air=1)	:	3.52
Volatile organic carbon content	:	84 % (EC/1999/13)
Evaporation rate (nBuAc=1)	:	Data not available.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Hazardous Polymerisation	:	No, hazardous, exothermical polymerization cannot occur.
Sensitivity to Mechanical Impact	:	No, product will not become self-reactive.
Sensitivity to Static Discharge	:	Yes, in certain circumstances product can ignite due to static electricity.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Routes of Exposure	:	Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Routes of Exposure	Material	Values
Oral	Solvent Naphtha (Petroleum), Light Aliphatic	LD 50: > 2,000 mg/kg, Rat
Dermal	Solvent Naphtha (Petroleum), Light Aliphatic	LD 50: > 2,000 mg/kg, Rat
Inhalation	Solvent Naphtha (Petroleum), Light Aliphatic	LC50: > 20 mg/l / 4 hours, Rat

Acute Oral Toxicity	:	Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Inhalation Toxicity	:	High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea;

		continued inhalation may result in unconsciousness and/or death.
Skin Irritation	:	Irritating to skin.
Eye Irritation	:	Expected to be non-irritating to eyes.
Respiratory Irritation	:	Not expected to be a respiratory irritant.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. (n-Heptane) Kidney: caused kidney effects in male rats which are not considered relevant to humans
Mutagenicity	:	No evidence of mutagenic activity.
Carcinogenicity	:	Not expected to be carcinogenic.
Reproductive and Developmental Toxicity	:	Not expected to be a developmental toxicant. Not expected to impair fertility.
Additional Information	:	Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.

12. ECOLOGICAL INFORMATION

Acute Toxicity		
Fish	:	Expected to be toxic: 1 < LC/EC/IC50 <= 10 mg/l
Aquatic Invertebrates	:	Expected to be toxic: 1 < LC/EC/IC50 <= 10 mg/l
Algae	:	Expected to be toxic: 1 < LC/EC/IC50 <= 10 mg/l
Microorganisms	:	Expected to be toxic: 1 < LC/EC/IC50 <= 10 mg/l
Mobility	:	Floats on water. Adsorbs to soil and has low mobility.
Persistence/degradability	:	Readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	:	Has the potential to bioaccumulate.
Other Adverse Effects	:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	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 and must be complied with.

14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification

UN/NA Number	UN 1206
Proper shipping name	HEPTANES
Class Division	3
Packing group	II
Shipping Description	HEPTANES, Class 3, UN 1206, PG II
Emergency Response Guide No	128

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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 Class/Description : Class B2 Flammable Liquid
Class D2B Other Toxic Effects - Skin Irritant

Inventory Status

AICS	:	Listed.	
DSL	:	Listed.	
INV (CN)	:	Listed.	
TSCA	:	Listed.	
EINECS	:	Listed.	265-192-2
KECI (KR)	:	Listed.	KE-31661
PICCS (PH)	:	Listed.	

16. OTHER INFORMATION

MSDS Version Number	:	3.2
MSDS Effective Date	:	2011-10-21
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this (M)SDS is in accordance with the Controlled Product Regulations.
MSDS Prepared By	:	Shell Product Stewardship; 1-855-697-4355
Uses and Restrictions	:	Industrial Solvent.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the

product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **SBP 80/110 LNH**
Uses : Industrial Solvent.
Product Code : Q5411

Manufacturer/Supplier : **Shell Chemicals Canada Ltd.**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada

Telephone : 1-855-697-4355
Fax : 1-866-213-7508

Emergency Telephone Number
CHEMTREC (24 hr) : 1-800-424-9300
Canutec (24 hr) : 1-613-996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Naphtha (petroleum), hydrotreated light
CAS No. : 64742-49-0

WHMIS Controlled Ingredients

Chemical Name	CAS No.	Conc. W/W
n-Hexane	110-54-3	< 5.00 %W

Refer to Chapter 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Health Hazards : Vapours may cause drowsiness and dizziness. Irritating to skin. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Central nervous system (CNS).

Signs and Symptoms : Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

Environmental Hazards : Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38,3° C), shortness of breath, chest congestion or continued coughing or wheezing.
Advice to Physician	:	Causes central nervous system depression. Dermatitis may result from prolonged or repeated exposure. Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical -12 °C / 10 °F (IP 170)
Explosion / Flammability limits in air	:	1 - 8 %(V)
Auto ignition temperature	:	367 °C / 693 °F (ASTM E-659)
Hazardous Combustion Products and Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective Measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate

containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Clean Up Methods : For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional Advice : See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Avoid contact with skin, eyes, and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Handle and open container with care in a well-ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains.

Storage : Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment. Bulk storage tanks should be diked (bunded). Storage Temperature: Ambient.

Product Transfer : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.

Unsuitable Materials : Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Additional Information : Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

In the absence of occupational exposure standards for this product, it is recommended that the following are adopted.

Material	Source	Type	ppm	mg/m3	Notation
RCP Aliphatic dearom. solvents 80 - 110	EU HSPA	TWA (8 h)		1,200 mg/m3	
n-Hexane	ACGIH	TWA	50 ppm		
	ACGIH	SKIN_DES			Can be absorbed through the skin.
	CAD SK OEL	8 HR ACL	50 ppm		
	CAD SK OEL	15 MIN ACL	62.5 ppm		
	CAD SK OEL	SKIN_DES			Can be absorbed through the skin.
	CAD SK OEL				Listed.

Consult local authorities for acceptable exposure limits within their jurisdiction.

Additional Information : Adequate ventilation to control airborne concentrations below the exposure guidelines/limits.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations

		to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN14387. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Hand Protection	:	Longer term protection: Nitrile rubber gloves Incidental contact/Splash protection: PVC or neoprene rubber gloves Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Monogoggles (EN166)
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron. Skin protection not ordinarily required beyond standard issue work clothes.
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

The physical and chemical property data are typical values and do not constitute a specification.

Appearance	:	Colourless. Liquid.
Odour	:	Paraffinic.
Odour threshold	:	GLC
pH	:	Not applicable
Boiling point	:	Typical 88 - 105 °C / 190 - 221 °F
Pour point	:	< -30 °C / -22 °F
Vapour pressure	:	Typical 4,000 Pa at 0 °C / 32 °F Typical 8,500 Pa at 20 °C / 68 °F Typical 29,000 Pa at 50 °C / 122 °F
Specific gravity	:	Data not available.
Density	:	Typical 714 kg/m3 at 15 °C / 59 °F (ASTM D-4052)
Water solubility	:	Immiscible.
Solubility in other solvents	:	Aliphatics Miscible. Aromatics Miscible.
n-octanol/water partition coefficient (log Pow)	:	3.4 - 5.2
Kinematic viscosity	:	Typical 0.61 mm2/s at 25 °C / 77 °F
Vapour density (air=1)	:	Data not available.
Electrical conductivity	:	0.7 pS/m (ASTM D-4308)
Coefficient of expansion	:	Typical 0.0009 / °C
Dielectric constant		Typical 2
Heat of vapourisation		Typical 320 J/g
Refractive index		Typical 1.397 at 20 °C / 68 °F (ASTM D-1218)
Reaction with water		Not applicable
Specific heat		Typical 2 kJ/kg °C
Saturated Vapour concentration (in air)		335 g/m3 at 20 °C / 68 °F (estimated value(s))

Thermal conductivity		Typical 0.13 W/m °C
Volatile organic carbon content		85 % (EC/1999/13)
Evaporation rate (nBuAc=1)	:	2.9 (DIN 53170, di-ethyl ether=1) 4.2 (ASTM D 3539, nBuAc=1)
Surface tension	:	Typical 21.2 mN/m at 20 °C / 68 °F (ASTM D-971)
Molecular weight	:	99 g/mol
Hygroscopicity	:	Immiscible.

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Hazardous Polymerisation	:	Data not available.
Sensitivity to Mechanical Impact	:	Data not available.
Sensitivity to Static Discharge	:	Data not available.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment : Information given is based on product testing, and/or similar products, and/or components.

Oral		LD 50: > 2,000 mg/kg, Rat
Dermal		LD 50: > 2,000 mg/kg, Rat
Inhalation		LC50: > 20 mg/l / 4 hours, Rat

Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 >2000 mg/kg Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 >2000 mg/kg
Acute Inhalation Toxicity	:	Expected to be of low toxicity: LC50 >20 mg/l High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Skin Irritation	:	Causes mild skin irritation.
Eye Irritation	:	Not irritating to eye.
Respiratory Irritation	:	Data not available.
Sensitisation	:	Not a skin sensitiser.
Repeated Dose Toxicity	:	Central nervous system: repeated exposure affects the nervous system. Kidney: caused kidney effects in male rats which are not considered relevant to humans
Mutagenicity	:	Not mutagenic.
Carcinogenicity	:	Not a carcinogen. Tumours produced in animals are not considered relevant to humans.
Reproductive and	:	Not expected to be a developmental toxicant. Not expected to

Developmental Toxicity impair fertility.
Additional Information : Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest.

12. ECOLOGICAL INFORMATION

Acute Toxicity

Fish	:	Toxic: LL/EL/IL50 1-10 mg/l
Aquatic Invertebrates	:	Toxic: LL/EL/IL50 1-10 mg/l
Algae	:	Harmful: LL/EL/IL50 10-100 mg/l
Microorganisms	:	Expected to be harmful: LL/EL/IL50 10-100 mg/l
Mobility	:	Floats on water. Adsorbs to soil and has low mobility.
Persistence/degradability	:	Readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	:	Has the potential to bioaccumulate.
Other Adverse Effects	:	None known.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Refer to Section 7 before handling the product or containers. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	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 and must be complied with.

14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification

UN/NA Number	UN 1268
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Class Division	3
Packing group	II
Shipping Description	PETROLEUM DISTILLATES, N.O.S., Class 3, UN 1268, PG II
Emergency Response Guide No	128

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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.

Inventory Status

DSL	:	Listed.	
INV (CN)	:	Listed.	
TSCA	:	Listed.	
EINECS	:	Listed.	265-151-9
KECI (KR)	:	Listed.	KE-25623

16. OTHER INFORMATION

MSDS Version Number	:	1.1
MSDS Effective Date	:	2011-11-14
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this (M)SDS is in accordance with the Controlled Product Regulations.
MSDS Prepared By	:	Shell Product Stewardship; 1-855-697-4355
Uses and Restrictions	:	Industrial Solvent.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Shell Paraffinic Oil X411

Product code : Q6565

Manufacturer or supplier's details

Company : **Shell Chemicals Canada**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada
Telephone : 1-855-697-4355
Telefax : 1-866-213-7508

Emergency telephone number

CHEMTREC (24 hr) : 1-800-424-9300
Canutec (24 hr) : 1-613-996-6666

Recommended use of the chemical and restrictions on use

Recommended use : Solvent.

Restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

Prepared by : Shell Product Stewardship

SECTION 2. HAZARDS IDENTIFICATION

WHMIS Classification : : THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

Other hazards which do not result in classification

May form flammable/explosive vapour-air mixture.
This material is a static accumulator.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Repeated exposure may cause skin dryness or cracking.

Potential Health Effects

Primary Routes of Entry : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.

Skin	:	No specific hazards under normal use conditions. Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
Eyes	:	No specific hazards under normal use conditions.
Ingestion	:	May be fatal if swallowed and enters airways.
Symptoms of Overexposure	:	If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.

Environmental Effects

Environmental Effects	:	Not classified as dangerous for the environment.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

WHMIS controlled ingredients

Chemical Name	CAS-No.	Concentration [%]
Alkanes, C18-24-branched and linear	1437280-85-7	100

SECTION 4. FIRST-AID MEASURES

General advice	:	Not expected to be a health hazard when used under normal conditions.
If inhaled	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
In case of skin contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
In case of eye contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
If swallowed	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear

within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

Most important symptoms and effects, both acute and delayed	:	If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.
Protection of first-aiders	:	When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
Immediate medical attention, special treatment	:	Potential for chemical pneumonitis. Call a doctor or poison control center for guidance.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	:	Do not use water in a jet.
Specific hazards during firefighting	:	Clear fire area of all non-emergency personnel. Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds. Flammable vapours may be present even at temperatures below the flash point. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water.
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Keep adjacent containers cool by spraying with water.
Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained.
	:	Avoid contact with skin, eyes and clothing. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Do not breathe fumes, vapour. Do not operate electrical equipment.
Environmental precautions	:	Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator.
Methods and materials for containment and cleaning up	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely Ventilate contaminated area thoroughly. If contamination of site occurs remediation may require specialist advice.
Additional advice	:	For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet.

SECTION 7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet.

Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Precautions for safe handling : Avoid inhaling vapour and/or mists.
Avoid contact with skin, eyes and clothing.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Bulk storage tanks should be diked (bunded).
When using do not eat or drink.

The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Avoidance of contact : Strong oxidising agents.

Product Transfer : Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Refer to guidance under Handling section.

Storage

Conditions for safe storage, including any incompatibilities : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Other data : Storage Temperature:
Ambient.

Bulk storage tanks should be diked (bunded).
Locate tanks away from heat and other sources of ignition.
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Keep away from aerosols, flammables, oxidizing agents,

corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Electrostatic charges will be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel., For container paints, use epoxy paint, zinc silicate paint.
Unsuitable material: Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Do not cut, drill, grind, weld or perform similar operations on or near containers.

Specific use(s) : Not applicable

See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
CENELEC CLC/TR 50404 (Electrostatics – Code of practice for the avoidance of hazards due to static electricity).

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

None established.

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany

http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Appropriate engineering controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:
Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Firewater monitors and deluge systems are recommended.
Eye washes and showers for emergency use.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

General Information:
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.
Practice good housekeeping.
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal protective equipment

Protective measures

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.

If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [Type A boiling point >65°C (149°F)].

Hand protection

Remarks	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Nitrile rubber gloves. Incidental contact/Splash protection: PVC, neoprene or nitrile rubber gloves For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye protection	:	If material is handled such that it could be splashed into eyes, protective eyewear is recommended.
Skin and body protection	:	Skin protection is not required under normal conditions of use. For prolonged or repeated exposures use impervious clothing over parts of the body subject to exposure. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to relevant Standard, and provide employee skin care programmes. Wear antistatic and flame retardant clothing, if a local risk assessment deems it so.
Thermal hazards	:	Not applicable
Hygiene measures	:	Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not ingest. If swallowed then seek immediate medical assistance.

Environmental exposure controls

General advice	:	Local guidelines on emission limits for volatile substances

must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	colourless
Odour	:	Hydrocarbon
Odour Threshold	:	Data not available
pH	:	Not applicable
Melting / freezing point	:	Data not available
Boiling point/boiling range	:	300 - 380 °C / 572 - 716 °F
Flash point	:	170 °C / 338 °F
Upper explosion limit	:	7 %(V)
Lower explosion limit	:	0.5 %(V)
Vapour pressure	:	Data not available
Relative vapour density	:	Data not available
Relative density	:	< 0.8
Density	:	< 800 kg/m3 (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	log Pow: > 7
Auto-ignition temperature	:	> 200 °C / > 392 °F
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	< 2 mm2/s (25 °C / 77 °F)
Explosive properties	:	Classification Code: Not classified
Oxidizing properties	:	Not applicable

Conductivity	:	Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Chemical stability	:	No hazardous reaction is expected when handled and stored according to provisions Stable under normal conditions of use.
Possibility of hazardous reactions	:	Reacts with strong oxidising agents.
Conditions to avoid	:	Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity.
Incompatible materials	:	Strong oxidising agents.
Hazardous decomposition products	:	Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Information on likely routes of exposure	:	Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Acute toxicity

Product:

Acute oral toxicity	:	LD50 Rat: > 5.000 mg/kg Remarks: Expected to be of low toxicity:

Acute inhalation toxicity : Remarks: Expected to be of low toxicity if inhaled.
LC50 greater than near-saturated vapour concentration.

Acute dermal toxicity : LD50 Rabbit: > 2.000 mg/kg
Remarks: Expected to be of low toxicity:

Skin corrosion/irritation

Product:

Remarks: Expected to be non-irritating to skin., Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.

Serious eye damage/eye irritation

Product:

Remarks: Expected to be non-irritating to eyes.

Respiratory or skin sensitisation

Product:

Remarks: Not expected to be a sensitiser.

Germ cell mutagenicity

Product:

Remarks: Not expected to be mutagenic.

Carcinogenicity

Product:

Remarks: Not expected to be carcinogenic.

Material	GHS/CLP Carcinogenicity Classification
Alkanes, C18-24-branched and linear	No carcinogenicity classification.

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

Reproductive toxicity

Product:

Remarks: Not expected to be a developmental toxicant., Not expected to impair fertility.

STOT - single exposure

Product:

Remarks: Not expected to be a hazard.

STOT - repeated exposure

Product:

Remarks: Not expected to be a hazard.

Aspiration toxicity

Product:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Further information

Product:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment	:	Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Ecotoxicity

Product:

Toxicity to fish (Acute toxicity)	:	LL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to crustacean (Acute toxicity)	:	EL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to algae/aquatic plants (Acute toxicity)	:	EL50 : > 100 mg/l Remarks: Expected to be practically non toxic:
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean (Chronic toxicity)	:	Remarks: Data not available
Toxicity to microorganisms (Acute toxicity)	:	IC50 : > 100 mg/l Remarks: Expected to be practically non toxic:

Persistence and degradability

Product:

Biodegradability	:	Remarks: Expected to be readily biodegradable., Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Product:

Bioaccumulation	:	Remarks: Has the potential to bioaccumulate.
Partition coefficient: n-octanol/water	:	log Pow: > 7

Mobility in soil

Product:

Mobility	:	Remarks: Floats on water., If it enters soil, it will adsorb to soil particles and will not be mobile.

Other adverse effects

no data available

Product:

Additional ecological information	:	Not expected to have ozone depletion potential.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment. 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 and must be complied with.
Contaminated packaging	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer. Comply with any local recovery or waste disposal regulations.

SECTION 14. TRANSPORT INFORMATION

National Regulations

TDG
Not regulated as a dangerous good

International Regulation

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

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

Pollution category	:	Annex I
Ship type	:	Annex I or Double hull vessels with carriage of oil certification
Product name	:	Gas Oil

Special precautions for user

Remarks	:	Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	This product is being carried under the scope of MARPOL Annex I. This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

SECTION 15. REGULATORY INFORMATION

WHMIS Classification : : THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

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

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

DSL	Listed
ENCS	Listed
KECI	Listed
PICCS	Listed

EINECS	Listed
TSCA	Listed

Other regulations : The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

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

SECTION 16. OTHER INFORMATION

Further information

NFPA Rating (Health, Fire, Reactivity) 1, 1, 0

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).

Version 1.1Revision Date 2015-11-24

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Shell Rotella T3 15W-40**
Product Code : 001D5433
Uses : Engine oil.

Manufacturer/Supplier : **Shell Oil Products US**
P.O. Box 4453
Houston TX 77210-4453
USA
SDS Request : (+1) 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Fischer-Tropsch derived base oil, consisting largely of branched, cyclic and linear hydrocarbons having carbon numbers in the range of C18 to C50.
Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Amber. Liquid at room temperature. Slight hydrocarbon.

Health Hazards : Not classified as dangerous for supply or conveyance.
Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards
Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.
Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Contact : May cause slight irritation to eyes.
Ingestion : Low toxicity if swallowed.
Other Information : Used oil may contain harmful impurities.
Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
Aggravated Medical : Pre-existing medical conditions of the following organ(s) or

Conditions		organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards	:	Not classified as dangerous for the environment.
Additional Information	:	Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST-AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	> 230 °C / 446 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)
Auto ignition temperature	:	> 320 °C / 608 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide may be evolved if incomplete combustion occurs. Unidentified organic and inorganic compounds.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment

to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Clean Up Methods : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.

Product Transfer : This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	
Oil mist, mineral	OSHA Z1	PEL(Mist.)		5 mg/m3	

Biological Exposure Index (BEI)
No biological limit allocated.

Exposure Controls	:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.
Personal Protective Equipment	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
Respiratory Protection	:	No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference

for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model.

Eye Protection : Wear safety glasses or full face shield if splashes are likely to occur.

Protective Clothing : Skin protection not ordinarily required beyond standard issue work clothes.

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Environmental Exposure Controls : Take appropriate measures to fulfil the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Amber. Liquid at room temperature.
Odour	:	Slight hydrocarbon.

pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 280 °C / 536 °F estimated value(s)
Pour point	:	Typical -20 °C / -4 °F
Flash point	:	> 230 °C / 446 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)
Auto-ignition temperature	:	> 320 °C / 608 °F
Vapour pressure	:	< 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	:	Typical 0.895 at 15 °C / 59 °F
Density	:	Typical 895 kg/m3 at 15 °C / 59 °F
Water solubility	:	Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 6 (based on information on similar products)
Kinematic viscosity	:	> 40 cSt at 40 °C / 104 °F
Vapour density (air=1)	:	> 1 (estimated value(s))
Electrical conductivity	:	This material is not expected to be a static accumulator.
Evaporation rate (nBuAc=1)	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Not expected to be carcinogenic.

Material	:	**Carcinogenicity Classification**
Highly refined mineral oil	:	ACGIH Group A4: Not classifiable as a human carcinogen.

(IP346 <3%)		
Highly refined mineral oil (IP346 <3%)	:	IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%)	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity : Not expected to be a hazard.

Additional Information : Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. Continuous contact with used engine oils has caused skin cancer in animal tests.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.

Mobility : Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.

Persistence/degradability : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation : Contains components with the potential to bioaccumulate.

Other Adverse Effects : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.

Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA)

Shell Rotella T3 15W-40 ()	Reportable quantity: 60 lbs
Zinc alkyl dithiophosphate (68649-42-3)	
Ethylene glycol (107-21-1)	Reportable quantity: 5000 lbs
Toluene (108-88-3)	Reportable quantity: 1000 lbs

Ethylenediamine also known as 1,2-ethanediamine (107-15-3)	Reportable quantity: 5000 lbs

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

The components with RQs are given for information.

Clean Water Act (CWA) Section 311

Toluene (108-88-3)	Reportable quantity: 1000 lbs
Ethylenediamine also known as 1,2-ethanediamine (107-15-3)	Reportable quantity: 5000 lbs

Under Section 311 of the Clean Water Act (CWA) this material is considered an oil. As such, spills into surface waters must be reported to the National Response Center at (800) 424-8802.

SARA Hazard Categories (311/312)
No SARA 311/312 Hazards.

SARA Toxic Release Inventory (TRI) (313)

Zinc alkyl dithiophosphate (68649-42-3)	1.66%
Diphenylamine (122-39-4)	0.01%
Ethylene glycol (107-21-1)	0.01%
Toluene (108-88-3)	0.01%

SARA Extremely Hazardous Substances (302/304)

Ethylenediamine also known as 1,2-ethanediamine (107-15-3)	Reportable quantity: 5000 lbs
Ethylenediamine also known as 1,2-ethanediamine (107-15-3)	Threshold Planning Quantity: 10000 lbs

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

Known to the State of California to cause birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Zinc alkyl dithiophosphate (68649-42-3)	1.6632%	Listed.
Diphenylamine (122-39-4)	0.0156%	

	Listed.
Ethylene glycol (107-21-1) 0.0156%	Listed.
Toluene (108-88-3) 0.0156%	Listed.
Ethylenediamine also known as 1,2-ethanediamine (107-15-3) 0.0156%	Listed.

Pennsylvania Right-To-Know Chemical List

Diphenylamine (122-39-4) 0.0156%	Environmental hazard. Listed.
Ethylene glycol (107-21-1) 0.0156%	Environmental hazard. Listed.
Toluene (108-88-3) 0.0156%	Listed. Environmental hazard.
Ethylenediamine also known as 1,2-ethanediamine (107-15-3) 0.0156%	Listed. Environmental hazard.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
SDS Version Number	:	1.3
SDS Effective Date	:	04/04/2014
SDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
SDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
SDS Distribution	:	The information in this document should be made available to all who may handle the product.
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Shell Heat Transfer Oil S2 X**
Uses : Heat transfer oil.

Manufacturer/Supplier : **Shell Oil Products US**
PO BOX 4453
Houston, TX 77210-4453
USA
MSDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information :

2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Amber. Liquid at room temperature. Slight hydrocarbon.

Health Hazards : Not classified as dangerous for supply or conveyance.
Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards
Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.
Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Contact : May cause slight irritation to eyes.
Ingestion : Low toxicity if swallowed.
Other Information : Used oil may contain harmful impurities.
Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
Aggravated Medical Conditions : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards : Not classified as dangerous for the environment.
Additional Information : Under normal conditions of use or in a foreseeable emergency,

this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical 260 °C / 500 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)(based on mineral oil)
Auto ignition temperature	:	> 320 °C / 608 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Clean Up Methods	:	Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an

absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	
Oil mist, mineral	OSHA Z1	PEL(Mist.)		5 mg/m3	
Oil mist, mineral	OSHA Z1A	TWA(Mist.)		5 mg/m3	

Additional Information : Shell has adopted as Interim Standards the OSHA Z1A values that were established in 1989 and later rescinded.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection	:	No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Wear safety glasses or full face shield if splashes are likely to occur.
Protective Clothing	:	Skin protection not ordinarily required beyond standard issue work clothes.
Monitoring Methods	:	Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental Exposure Controls	:	Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Amber. Liquid at room temperature.
Odour	:	Slight hydrocarbon.
pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 280 °C / 536 °F estimated value(s)
Pour point	:	Typical -6 °C / 21 °F
Flash point	:	Typical 260 °C / 500 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	:	> 320 °C / 608 °F
Vapour pressure	:	< 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	:	Typical 0.865 at 15 °C / 59 °F

Density	:	Typical 865 kg/m3 at 15 °C / 59 °F
Water solubility	:	Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 6 (based on information on similar products)
Kinematic viscosity	:	Typical 64 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	> 1 (estimated value(s))
Evaporation rate (nBuAc=1)	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.
Reproductive and Developmental Toxicity	:	Not expected to be a hazard.
Additional Information	:	Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	:	Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 >

100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility	:	Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability	:	Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation	:	Contains components with the potential to bioaccumulate.
Other Adverse Effects	:	Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

SARA Hazard Categories (311/312)
No SARA 311/312 Hazards.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
MSDS Version Number	:	1.0
MSDS Effective Date	:	03/09/2011
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product.
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Shell Rotella T1 40**
Uses : Engine oil.

Manufacturer/Supplier : **SOPUS Products**
PO BOX 4427
Houston, TX 77210-4427
USA
MSDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Amber. Liquid at room temperature. Slight hydrocarbon.

Health Hazards : Not classified as dangerous for supply or conveyance.
Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards
Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.
Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Contact : May cause slight irritation to eyes.
Ingestion : Low toxicity if swallowed.
Other Information : Used oil may contain harmful impurities.
Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
Aggravated Medical Condition : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards : Not classified as dangerous for the environment.
Additional Information : Under normal conditions of use or in a foreseeable emergency,

this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	> 230 °C / 446 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)(based on mineral oil)
Auto ignition temperature	:	> 320 °C / 608 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Clean Up Methods	:	Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an

absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Mist.)		5 mg/m3	
Oil mist, mineral	ACGIH	STEL(Mist.)		10 mg/m3	

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne

		concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Wear safety glasses or full face shield if splashes are likely to occur.
Protective Clothing	:	Skin protection not ordinarily required beyond standard issue work clothes.
Monitoring Methods	:	Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Environmental Exposure Controls	:	Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Amber. Liquid at room temperature.
Odour	:	Slight hydrocarbon.
pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 280 °C / 536 °F estimated value(s)
Pour point	:	-20 °C / -4 °F
Flash point	:	> 230 °C / 446 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	:	> 320 °C / 608 °F
Vapour pressure	:	< 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	:	0.89
Density	:	0.895 kg/m3
Water solubility	:	Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 6 (based on information on similar products)
Vapour density (air=1)	:	> 1 (estimated value(s))

Evaporation rate (nBuAc=1) : Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.
Reproductive and Developmental Toxicity	:	Not expected to be a hazard.
Additional Information	:	Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. Continuous contact with used engine oils has caused skin cancer in animal tests.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity	:	Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test

extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility	:	Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability	:	Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation	:	Contains components with the potential to bioaccumulate.
Other Adverse Effects	:	Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS All components listed or

	polymer exempt.
TSCA	All components listed.
DSL	All components listed.

SARA Hazard Categories (311/312)
No SARA 311/312 Hazards.

SARA Toxic Release Inventory (TRI) (313)

Zinc alkyl dithiophosphate (68649-42-3)	5.00%

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Zinc alkyl dithiophosphate (68649-42-3)	Listed.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
MSDS Version Number	:	1.0
MSDS Effective Date	:	10/07/2009
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product.
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

Safety Data Sheet

Section 01 – Product and Company Identification

Product Identifier	Sodium Hypochlorite (3-20%)
Other Means of Identification	Hypochlor-12, Bleach, Clorox, Hypochlorous acid-sodium salt, Javel water, Liquid Bleach, NaOCl, Soda Bleach, Sodium Chloride Oxide, Sodium Oxychloride, Javex.
Product Use and Restrictions on Use	Disinfectant, bleaching agent, source of available chlorine, deodorizer.
Initial Supplier Identifier	ClearTech Industries Inc. 1500 Quebec Avenue Saskatoon, SK. Canada S7K 1V7
Prepared By	ClearTech Industries Inc. Technical Writer Phone: 1 (800) 387-7503
24-Hour Emergency Phone	Phone: 1 (306) 664 – 2522

Section 02 - Hazard Identification

GHS-Classification

Skin Corrosion/Irritation	Category 1B
Serious Eye Damage/Irritation	Category 1

Physical Hazards

Corrosive to Metals	Category 1

Danger

Hazard Statements

H314 – Causes severe skin burns and eye damage.
H318 – Causes serious eye damage.
H290 – May be corrosive to metals.
EUH 031 – Contact with acids liberates toxic gas.

Pictograms

Precautionary Statements

P234 – Keep only in original container.
P405 – Store locked up.
P260 – Do not breathe dust/fume/gas/mist/vapours/spray.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.

P301 +P330 + P331 – IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 – IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin.
P363 – Wash contaminated clothing before reuse.
P304 + P340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310 – Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P390 – Absorb spillage to prevent material damage.
P501 – Dispose of contents/container in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act

Section 03 - Composition / Information on Ingredients

Chemical Name	CAS Number	Weight %	Unique Identifiers
Sodium Hypochlorite	7681-52-9	3.02-16.80%	None
Water	7732-18-5	83.2-96.98%	

Section 04 - First Aid Measures

Inhalation

Can release corrosive chlorine gas. Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Seek immediate medical attention.

Skin Contact / Absorption

As quickly as possible, flush with lukewarm, gently flowing water for at least 20 minutes, or until the chemical is removed. If irritation persists, repeat flushing. Under running water, remove contaminated clothing, shoes and leather goods. Completely decontaminate clothing, shoes and leather goods before reuse, or discard. Obtain medical advice immediately.

Eye Contact

Contact lenses should never be worn when working with this product. Flush immediately with lukewarm, gently flowing water for at least 30 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. DO NOT INTERRUPT FLUSHING. Take care not to rinse contaminated water into the unaffected eye or onto the face. Seek immediate medical attention.

Ingestion

NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Rinse mouth and repeat administration of water. Quickly transport victim to an emergency care facility.

Additional Information

Not Available

Section 05 - Fire Fighting Measures

Suitable Extinguishing Media

Sodium hypochlorite solutions do not burn. Extinguish fire using extinguishing agents suitable for the surrounding fire and not contraindicated for use with sodium hypochlorite. Cool exposed containers with water.

Unsuitable Extinguishing Media

DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed.

Specific Hazards Arising From the Chemical

Sodium hypochlorite decomposes when heated, giving off corrosive chlorine and hydrogen chloride. Solutions decompose when exposed to sunlight, giving off oxygen gas. However, the amount of oxygen produced is not sufficient to cause combustion. Explosive decomposition may occur under fire conditions and closed containers may rupture violently due to a rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time.

Special Protective Equipment for Fire-Fighters	Wear NIOSH-approved self-contained breathing apparatus and protective clothing. The decomposition products of sodium hypochlorite, such as chlorine and hydrogen chloride are extremely hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective equipment (Bunker Gear) will not provide adequate protection.
Further Information	Not Available

Section 06 - Accidental Release Measures

Personal Precautions / Protective Equipment / Emergency Procedures	Wear appropriate personal protective equipment. Ventilate area. Only enter area with PPE. Stop or reduce leak if safe to do so.
Environmental Precautions	Prevent material from entering sewers or confined spaces. Notify local health and wildlife officials. Notify operators of nearby water intakes.
Methods and Materials for Containment and Cleaning Up	SMALL SPILLS: Clean up spill with non-reactive absorbent and place in suitable, covered, labelled containers. Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. Small spills of sodium hypochlorite solutions can be broken down by covering it with a reducing agent such as sodium thiosulfate, sodium metabisulfite, or a ferrous salt. With the sulfite or ferrous salt, add some dilute (2 M) sulfuric acid to speed up the reaction. Transfer the mixture into large containers of water and neutralize with soda ash (sodium carbonate). LARGE SPILLS: Contact fire and emergency services and supplier for advice.

Section 07 - Handling and Storage

Precautions for Safe Handling	This material is a CORROSIVE liquid. 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. Avoid generating mists. Prevent the release of mists into the workplace air. Inspect containers for damage or leaks before handling. Label containers. Never add water to a corrosive. Always add corrosives to water. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation. Never return contaminated material to its original container. Have suitable emergency equipment for fires, spills and leaks readily available.
Conditions for Safe Storage	Store in a cool, dry, well-ventilated area, out of direct sunlight and away from heat sources. Strong solutions (greater than 10% available chlorine) may slowly give off chlorine during storage, especially when warm (above 18°C). Vent caps may be required to prevent a build-up of pressure that could cause containers to burst. Always store in original labelled container. Keep containers tightly closed when not in use and when empty. Empty containers may contain hazardous residues. Protect label and keep it visible.
Incompatibilities	Primary amines, aromatic amines, ammonium salts, phenylacetonitril, ammonia, urea, phenylacetonitrile, acids, metals, reducing agents, ethyleneimine, methanol, formic acid, furfuraldehyde, ethandiol, sodium ethylenedioaminetetracetate solution, sodium hydroxide solution.

Section 08 - Exposure Controls and Personal Protection

Exposure Limit(s)

Component	Regulation	Type of Listing	Value
Sodium hypochlorite	AIHA	WEEL-STEL	2mg/m^3 (15 min)
Chlorine	ACGIH	TLV-TWA	0.5 ppm

Engineering Control(s)

Ventilation Requirements

Mechanical ventilation (dilution or local exhaust), process or personnel enclosure and control of process conditions must be provided in accordance with all fire codes and regulatory requirements. Supply sufficient replacement air to make up for air removed by exhaust systems.

Other

Emergency shower and eyewash must be available and tested in accordance with regulations and be in close proximity.

Protective Equipment

Eyes/Face

Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should never be worn; they may contribute to severe eye injury.

Hand Protection

Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Skin and Body Protection

Body suite, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

Guidelines for sodium hypochlorite, less than 30%:
RECOMMENDED (resistance to breakthrough longer than 8 hours): Butyl rubber, Natural rubber, Neoprene rubber, Nitrile rubber, Polyethylene, Polyvinyl chloride, Viton(TM), Silver Shield/4H(TM) (polyethylene/ethylene vinyl alcohol), Tychem(TM) SL (Saranex(TM)).

There is evidence that this material can cause serious skin injury (e.g. corrosion or absorption hazard).
Recommendations are NOT valid for very thin natural rubber, neoprene, nitrile and PVC gloves (0.3 mm or less).
Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.

Impervious boots of chemically resistant material should be worn at all times. No special footwear is required other than what is mandated at place of work.

Respiratory Protection

No specific guidelines are available. Contact chemical manufacturer/supplier for advice. Respiratory protection guidelines for chlorine gas are available.

NIOSH RECOMMENDATIONS FOR CHLORINE CONCENTRATIONS IN AIR:
Up to 5 ppm:
(APF = 10) Chemical cartridge respirator*; SAR*.
Up to 10 ppm:
(APF = 25) SAR operated in a continuous-flow mode;* Powered, air-purifying respirator with cartridge(s)*.
(APF = 50) Chemical cartridge respirator with a full facepiece and cartridge(s); Air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister; SCBA with a full facepiece; Full facepiece SAR.
A NIOSH-approved respirator suitable for chlorine is recommended. Where a higher level of protection is required, use a self-contained breathing apparatus.

Thermal Hazards

Not Available

Section 09 - Physical and Chemical Properties

Appearance

Physical State

Liquid

Colour

Clear, greenish-yellow solution.

Odour	Strong chlorine odour.
Odour Threshold	Not Available

Property

pH	10.8-11.2
Melting Point/Freezing Point	-6°C (5% solution)
Initial Boiling Point and Boiling Range	Slowly decomposes above 40°C
Flash Point	Not Applicable
Evaporation Rate	Not Available; probably very low
Flammability	Non-Flammable
Upper Flammable Limit	Not Applicable
Lower Flammable Limit	Not Applicable
Vapour Pressure (mm Hg, 20°C)	Does not form a vapour
Vapour Density (Air=1)	Not Available
Relative Density	Not Available
Solubility(ies)	Completely soluble in water
Partition Coefficient: n-octanol/water	Log P_{OW} = -3.42 (estimated)
Auto-ignition Temperature	Not Applicable
Decomposition Temperature	Slowly decomposes above 40°C
Viscosity	Not Available
Explosive Properties	Pressure buildup in containers could result in an explosion when heated or in contact with acidic fumes. Vigorous reaction with oxidizable organic materials may result in a fire.
Specific Gravity (Water=1)	1.1-1.2
% Volatiles by Volume	Not Available
Formula	NaOCl
Molecular Weight	74.44 g/mol

Section 10 - Stability and Reactivity

Reactivity	Sodium hypochlorite solution gives off oxygen when heated or when exposed to sunlight. However, the amount is small and will not cause or contribute to combustion. The solutions are, therefore, not considered to be oxidizing agents.
Stability	Sodium hypochlorite solutions decompose slowly at normal temperatures releasing low concentrations of corrosive chlorine gas.
Possibility of Hazardous Reactions	Hazardous polymerization will not occur.

Conditions to Avoid	Heat, sunlight, acidic conditions, the presence of metals and other impurities.
Incompatible Materials	Primary amines, aromatic amines, ammonium salts, phenylacetonitril, ammonia, urea, phenylacetonitrile, acids, metals, reducing agents, ethyleneimine, methanol, formic acid, furfuraldehyde, ethandiol, sodium ethylenedioaminetetracetate solution, sodium hydroxide solution.
Hazardous Decomposition Products	Chlorine, sodium chlorate.

Section 11 - Toxicological Information

Acute Toxicity

Component	Oral LD_{50}	Dermal LD_{50}	Inhalation LC_{50}
Sodium Hypochlorite (20%)	44.5 g/kg (rat)	> 50 g/kg (rabbit)	> 26.25 g/m^3 (rat, 4hr)

Chronic Toxicity – Carcinogenicity

Component	IARC
Sodium Hypochlorite	Group 3: Not classifiable as to it's carcinogenicity to humans. [hypochlorite salts]

Skin Corrosion/Irritation	Very dilute solutions have caused negligible irritation, while more concentrated solutions have caused corrosive injury to skin and eyes.
Ingestion	Burning of the mouth and throat, abdominal cramps, nausea, vomiting, diarrhea, shock. May lead to convulsions, coma, and even death.
Inhalation	Irritant of the nose and throat, causing coughing, difficulty breathing, and pulmonary edema.
Serious Eye Damage/Irritation	Very dilute solutions have caused no irritation. More concentrated solutions have caused corrosive injury, which did not heal within 21 days.
Respiratory or Skin Sensitization	Negative results (0/20 guinea pigs sensitized) have been obtained for 8% sodium hypochlorite solution in a skin sensitization test. Insufficient details are available to evaluate a report of a positive result (positive reactions in 2/10 animals) obtained using 6% sodium hypochlorite (pH 11.2) with the guinea pig ear swelling test for non-immunological contact urticaria.
Germ Cell Mutagenicity	The available information does not suggest that sodium hypochlorite is mutagenic.
Reproductive Toxicity	There is insufficient information available to draw conclusions.
STOT-Single Exposure	May cause respiratory irritation.
STOT-Repeated Exposure	Not Available
Aspiration Hazard	Prolonged or repeated overexposure causes lung damage.
Synergistic Materials	Not Available

Section 12 - Ecological Information

Ecotoxicity

Component	Toxicity to Algae	Toxicity to Fish	Toxicity to Daphnia and Other Aquatic Invertebrates
Sodium Hypochlorite	EC_{50}(Red algae, 96hr): 46mg/L	LC_{50}(Salmo gairdneri, 48hr): 0.07mg/L	LC_{50}(Daphnia magna, 48hr): 0.032mg/L

Biodegradability	Not Available
Bioaccumulation	No evidence to support any rating.

Mobility	Not Available
Other Adverse Effects	Not Available

Section 13 - Disposal Considerations

Waste From Residues/Unused Products	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.
Contaminated Packaging	Dispose in accordance with all federal, provincial, and/or local regulations including the Canadian Environmental Protection Act.

Section 14 - Transport Information

UN Number	UN 1791
UN Proper Shipping Name	HYPOCHLORITE SOLUTION
Transport Hazard Class(es)	8
Packaging Group	III
Environmental Hazards	Not listed as a marine pollutant under Canadian TDG Regulations, schedule III.
Special Precautions	Not Available
Transport in Bulk	Not Available

TDG

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

PRODUCT CLASSIFICATION: This product has been classified on the preparation date specified at section 14 of this MSDS / SDS, for transportation in accordance with the requirements of part 2 of the Transportation of Dangerous Goods Regulations. If applicable, testing and/or published test data regarding the classification of this product are listed in the references at section 16 of this MSDS / SDS.

Section 15 - Regulatory Information

NOTE: THE PRODUCT LISTED ON THIS SDS HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS. THIS SDS CONTAINS ALL INFORMATION REQUIRED BY THOSE REGULATIONS.

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for disinfection and oxidation at a maximum dosage for the following:

Sodium hypochlorite 5%: 174mg/L	Sodium hypochlorite 11%: 79mg/L	Sodium hypochlorite 17%: 51mg/L
Sodium hypochlorite 6%: 145mg/L	Sodium hypochlorite 12%: 72mg/L	Sodium hypochlorite 18%: 48mg/L
Sodium hypochlorite 7%: 125mg/L	Sodium hypochlorite 13%: 67mg/L	Sodium hypochlorite 19%: 46mg/L
Sodium hypochlorite 8%: 109mg/L	Sodium hypochlorite 14%: 62mg/L	Sodium hypochlorite 20%: 43mg/L
Sodium hypochlorite 9%: 97mg/L	Sodium hypochlorite 15%: 58mg/L	
Sodium hypochlorite 10%: 87mg/L	Sodium hypochlorite 16%: 55mg/L	

NOTE: Any product strength below 7% is not regulated by TDG.

Sanitizer Use: to obtain 10 liters of a 200 mg/L solution as available chlorine, use 16.7 mL of Hypochlor-12 for each 10 liters of clean, potable water.

Section 16 - Other Information

Preparation Date July 29, 2015

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 / SDS 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 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 center.

References:

1) CHEMINFO
2) TOXNET
3) eChemPortal
4) ECHA
5) Transportation of Dangerous Goods Canada
6) HSDB
7) PAN

ClearTech Industries Inc. - Locations

Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7
Phone: 1(306) 664 – 2522
Fax: 1(888) 281-8109

www.cleartech.ca

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

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Shell Tellus S2 M 100**
Uses : Hydraulic oil.

Manufacturer/Supplier : **SOPUS Products**
PO BOX 4427
Houston, TX 77210-4427
USA
SDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Amber. Liquid at room temperature. Slight hydrocarbon.

Health Hazards : High-pressure injection under the skin may cause serious damage including local necrosis.

Safety Hazards : Not classified as flammable but will burn.

Environmental Hazards : Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards

Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.

Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Eye Contact : May cause slight irritation to eyes.

Ingestion : Low toxicity if swallowed.

Other Information : High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in

nausea, vomiting and/or diarrhoea.

Aggravated Medical Conditions	:	Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards	:	Not classified as dangerous for the environment.
Additional Information	:	Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical 250 °C / 482 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)(based on mineral oil)
Auto ignition temperature	:	> 320 °C / 608 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases

(smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Clean Up Methods	:	Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
Additional Advice	:	Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions	:	Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Handling	:	Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Storage	:	Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.
Product Transfer	:	This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.
Recommended Materials	:	For containers or container linings, use mild steel or high density polyethylene.
Unsuitable Materials	:	PVC.
Additional Information	:	Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	
Oil mist, mineral	OSHA Z1	PEL(Mist.)		5 mg/m3	

Biological Exposure Index (BEI)
No biological limit allocated.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a

non-perfumed moisturizer is recommended.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.

Eye Protection : Wear safety glasses or full face shield if splashes are likely to occur.

Protective Clothing : Skin protection not ordinarily required beyond standard issue work clothes.

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Environmental Exposure Controls : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Amber. Liquid at room temperature.
Odour	:	Slight hydrocarbon.
pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 280 °C / 536 °F estimated value(s)
Pour point	:	Typical -24 °C / -11 °F
Flash point	:	Typical 250 °C / 482 °F (COC)

Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	:	> 320 °C / 608 °F
Vapour pressure	:	< 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	:	Typical 0.891 at 15 °C / 59 °F
Density	:	Typical 891 kg/m3 at 15 °C / 59 °F
Water solubility	:	Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 6 (based on information on similar products)
Kinematic viscosity	:	Typical 100 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	> 1 (estimated value(s))
Electrical conductivity	:	This material is not expected to be a static accumulator.
Evaporation rate (nBuAc=1)	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Not expected to be carcinogenic. Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Material	:	**Carcinogenicity Classification**
Highly refined mineral oil (IP346 <3%)	:	ACGIH Group A4: Not classifiable as a human carcinogen.

Highly refined mineral oil (IP346 <3%)	:	IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%)	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity : Not expected to be a hazard.

Additional Information : Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract. Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility : Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.

Persistence/degradability : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation : Contains components with the potential to bioaccumulate.

Other Adverse Effects : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.

Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

SARA Hazard Categories (311/312)
No SARA 311/312 Hazards.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Alkyl acrylate (as impurity) (103-11-7)	Listed.

Pennsylvania Right-To-Know Chemical List

Alkyl acrylate (as impurity) (103-11-7)	Listed.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
SDS Version Number	:	1.2
SDS Effective Date	:	02/06/2013
SDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
SDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
SDS Distribution	:	The information in this document should be made available to all who may handle the product.
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.