



CITY OF YELLOWKNIFE

July 17, 2013

Mackenzie Valley Land and Water Board  
Box 2130, 7th Floor - 4910 50th Avenue  
Yellowknife, NT X1A 2P6

Attention: Miki Ehrlich, Regulatory Officer

**RE: Water Licence No. MV2009L3-0007  
Response to New Water Treatment Plant Letter Dated June 7, 2013**

Dear Ms. Ehrlich,

This letter is in response to the request from the Mackenzie Valley Land and Water Board (MVLWB) for additional information regarding the new Water Treatment Plant (WTP) the City of Yellowknife will be building. The items requested are discussed in the following paragraphs.

**Item 1: The anticipated composition and volume of the new waste stream(s) that will be generated by the new WTP**

Please see the following table for information on the waste stream composition and volume.

Waste Stream	Neutralized Chemical Waste	Sludge	Settled Wastewater
<b>Composition</b>	<ul style="list-style-type: none"><li>Citric acid, <math>\leq 2\%</math></li><li>Sodium hydroxide (caustic), <math>\leq 1\%</math></li><li>Sodium hypochlorite, <math>\leq 2000</math> ppm</li><li>Sodium bisulfite, <math>\leq 0.2\%</math></li></ul> Solution temperature $\leq 35^\circ$ Celsius	<ul style="list-style-type: none"><li>Water</li><li>Silt, etc. from the water source</li><li>Coagulant (e.g. alum) and flocculant aid (polymer). Type to be determined during commissioning.</li></ul> < 4% solids by weight	<ul style="list-style-type: none"><li>Water</li><li>Fine particles from the water source</li><li>Trace amounts of coagulant (e.g. alum) and flocculant aid (polymer). Type to be determined.</li></ul> Total Suspended Solids <100 (95% of the time TSS <25)

Waste Stream	Neutralized Chemical Waste	Sludge	Settled Wastewater
Average Expected Volume in 20 years (20 MLD) (m3/year)	14,500	950	240,000
Average Expected Volume at current flows (8 MLD) (m3/year)	10,300	650	240,000 (Preliminary estimate. Backwash frequency to be confirmed during plant commissioning)
Destination	Sewage lagoon	Sewage lagoon	Recycled into WTP process with raw water from the water source. Emergency to Yellowknife Bay.

**Item 2:** Any management actions that would be taken to ensure that water quality at the outflow point of the sewage lagoon system is not affected by the introduction of these new waste(s);

As the City is still working on studies regarding the Fiddler’s Lake Sewage Lagoon, including the CCME Sewage Effluent Characterization Study and the Fiddler’s Lake Treatment System Plan, a response to item 2 cannot be provided at this time. Any management actions will depend on the system as a whole, and until we know and understand how the existing treatment system is working, we cannot determine whether the WTP waste streams will have an adverse effect on the current lagoon system. It is anticipated the outstanding lagoon reports will be submitted to the MVLWB before the WTP is operational. This will allow the City to address any management actions for the lagoon (should they be necessary) before the waste streams from the WTP are introduced.

**Item 3:** A list of the chemicals that will be used, their purpose, and an MSDS sheet for each chemical to be used.

Please see the following table for information on the chemicals that will be used. The MSDS sheets for the chemicals are attached to this letter.

Chemical	Concentration	Purpose
Citric Acid	50%	Membrane filter cleaning
Sodium Hydroxide (caustic)	25%	Membrane filter cleaning
Sodium Hypochlorite	12.5%	Membrane filter cleaning



Chemical	Concentration	Purpose
Sodium Bisulfite	40%	Added to the membrane chemical cleaning waste to neutralize sodium hypochlorite prior to disposal
Sodium Hypochlorite, generated on site by electrolysis of brine	0.8%	Disinfection of the water being treated to be potable
Fluorosilicic Acid	23 – 27%	Added to the potable water to provide fluoride for the public's dental health
Coagulant (Alum assumed but type to be selected during commissioning)	45 – 55%	Used with a gravity thickener (plate settler) to clarify the non- chemical filter backwash waste
Flocculant Aid (polymer assumed, specific type to be selected during commissioning)		Used with a gravity thickener (plate settler) to clarify the non- chemical filter backwash waste

If you have any questions or concerns regarding this information, please contact me at 920-5689 or by email at [walexander@yellowknife.ca](mailto:walexander@yellowknife.ca).

Sincerely,



Wendy Alexander, P. Eng.  
Manager, Public Works and Engineering

Encl: MSDS Sheets for Chemicals

(Docs#371342)



**MATERIAL SAFETY DATA SHEET****Aluminum Sulphate Solution****Section 01 - Product And Company Information**

**Product Identifier** ..... Aluminium sulphate solution

**Product Use** ..... Coagulating agent in municipal and industrial water and wastewater treatment, additive in papermaking.

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

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

**Preparation Date**..... October 25, 2012

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

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

**Hazardous Ingredients**..... Aluminum sulphate hydrate                      45-55%

**CAS Number**..... Aluminum sulphate hydrate                              16828-12-9

**Synonym (s)**..... Liquid alum; aluminum sulfate solution; papermaker's alum; sulphuric acid, aluminum salt.

**Section 03 - Hazard Identification**

**Inhalation**..... Inhalation of mists can be irritating to the respiratory tract and lungs.



- Skin Contact / Absorption**..... Mild to moderate irritation can occur. Aluminum is very poorly absorbed through the skin and toxic effects would not be expected following short-term skin contact.
- Eye Contact**..... May result in mild to moderate irritation to eyes.
- Ingestion**..... Amounts ingested incidental to industrial handling are not likely to cause injury. Large amounts may cause abdominal pain, nausea, vomiting. Can cause burns of the mouth, bleeding stomach, incoordination, muscle spasms, and kidney injury.
- Exposure Limits**..... ACGIH/TLV-TWA= 2mg/m<sup>3</sup>(Soluble Aluminum Salts)  
OSHA/PEL-TWA= 2mg/m<sup>3</sup>(Soluble Aluminum Salts)

**Section 04 - First Aid Measures**

- Inhalation**..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek immediate medical attention.
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.
- Eye Contact**..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.
- Ingestion**..... Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Give large amounts of water. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.
- Additional Information**..... Not available

**Section 05 - Fire Fighting Measures**

- Conditions of Flammability**..... Non-flammable
- Means of Extinction**..... Product itself does not burn. However, decomposition product sulfur trioxide will react with water to form sulfuric acid. Use appropriate extinguishing agent.
- Flash Point**..... Not applicable



- Auto-ignition Temperature**..... Not applicable
- Upper Flammable Limit** ..... Not applicable
- Lower Flammable Limit**..... Not applicable
- Hazardous Combustible Products**... Under fire conditions (or at temperatures greater than 650°C), product decomposes to give off sulfur trioxide, an oxidizing agent which will support combustion.
- Special Fire Fighting Procedures**..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.
- Explosion Hazards**..... Liquid alum may react with some metals, to give flammable, potentially explosive hydrogen gas. Hydrogen gas can accumulate to explosive concentrations inside confined spaces. Follow appropriate NFPA codes.

**Section 06 - Accidental Release Measures**

- Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers. Cover spill with dry earth, sand or other non-combustible material.
- Deactivating Materials**..... Lime, limestone, soda ash, sodium bicarbonate, dilute sodium hydroxide or dilute aqua ammonia.

**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. Store at temperatures below 40°C and above 0°C.

**Section 08 - Personal Protection and Exposure Controls**

**Protective Equipment**

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



- Respiratory**..... A NIOSH/MSHA approved air-purifying respirator equipped with acid gas/fume, mist cartridges for concentrations up to 20 mg/m<sup>3</sup>. An air-supplied respirator if concentrations are higher or unknown.
  
- Gloves**..... Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
  
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
  
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

### Engineering Controls

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

<b>Section 09 - Physical and Chemical Properties</b>
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- Physical State**..... Liquid
  
- Odor and Appearance**..... Pale straw coloured, clear odourless liquid.
  
- Odor Threshold**..... Not available
  
- Specific Gravity (Water=1)**..... 1.335
  
- Vapor Pressure (mm Hg, 20C)**..... Not available
  
- Vapor Density (Air=1)**..... Not available
  
- Evaporation Rate**..... Not available
  
- Boiling Point**..... 101°C
  
- Freeze/Melting Point**..... -16°C
  
- pH**..... 1.9-2.3



**Water/Oil Distribution Coefficient**.... Not available  
**Bulk Density**..... Not available  
**% Volatiles by Volume**..... Not available  
**Solubility in Water**..... Completely miscible  
**Molecular Formula**.....  $\text{Al}_2(\text{SO}_4)_3 \cdot 14\text{H}_2\text{O}$   
**Molecular Weight**..... 594.14

**Section 10 - Stability and Reactivity**

**Stability**..... Stable under normal conditions.  
**Incompatibility**..... Corrosive to carbon steel, aluminum, and zinc. Reacts with strong bases to form aluminum hydroxide.  
**Hazardous Products of Decomposition**.. May react with many metals including carbon steel and aluminum to form flammable gases including sulphur oxides and hydrogen. Liquid alum is stable below 60°C.  
**Polymerization**..... Will not occur

**Section 11 - Toxicological Information**

**Irritancy**..... Corrosive  
**Sensitization**..... Not available  
**Chronic/Acute Effects**..... Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapors or sprays (mists) may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.  
**Synergistic Materials**..... Not available  
**Animal Toxicity Data**.....  $\text{LD}_{50}(\text{mouse, oral}) = >9000 \text{ mg/kg}$   
 $\text{LD}_{50}(\text{rat, oral}) = >9000 \text{ mg/kg}$   
**Carcinogenicity**..... Sulfuric acid mist: Classified 1 (Proven for humans) by IARC, 1 (Known to be human carcinogens) by NTP  
  
Sulfuric acid mist: Classified A2 (Suspected for humans) by ACGIH





Reproductive Toxicity..... Not available

Teratogenicity..... Not available

Mutagenicity..... Not available

**Section 12 - Ecological Information**

Fish Toxicity..... LD<sub>50</sub>(72 hrs, goldfish)= 100mg/L

Biodegradability..... The products of biodegradation are more toxic than the original product.

Environmental Effects..... May be harmful to aquatic life. Toxicity is primarily associated with the acidic pH. Acidic soil conditions develop where contamination with this material occurs.

**Section 13 - Disposal Consideration**

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

**Section 14 - Transport Information**

**TDG Classification**

Class..... 8

Group..... III

PIN Number..... UN 3264

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

**Section 15 - Regulatory Information**

WHMIS Classification.....E

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

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for coagulation and flocculation at a maximum dosage of 330mg/L.

## Section 16 - Other Information

**Note:** The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

### **Attention: Receiver of the chemical goods / MSDS coordinator**

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution<sup>®</sup> initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

## ClearTech Industries Inc. - Locations

**Corporate Head Office: 1500 Quebec Avenue, Saskatoon, SK, S7K 1V7**

**Phone: 306-664-2522**

**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	19 Peters Ave, North Corman Park	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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

**MATERIAL SAFETY DATA SHEET****Citric Acid, 50% Solution****Section 01 - Chemical And Product And Company Information**

**Product Identifier** ..... Citric Acid 50% Solution

**Product Use** ..... Membrane cleaning in water treatment, pipe cleaning, metal oxide deposit removal in boilers

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

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

**Preparation Date**..... December 14, 2009

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

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

**Hazardous Ingredients**..... Citric Acid 48-52%

**CAS Number**..... Citric Acid 77-92-9

**Synonym (s)**..... None

**Section 03 - Hazard Identification**

**Inhalation**..... Breathing of vapour or mist is possible, may cause irritation.

**Skin Contact / Absorption**..... Can cause skin irritation with contact such as redness & burning.



- Eye Contact**..... Can cause eye irritation such as tearing, stinging, redness and swelling.
- Ingestion**..... Ingesting small amounts not likely to cause harmful effects. Ingesting large amounts may however, be harmful.
- Exposure Limits**..... Not available

**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**..... Seek medical attention. Do not give anything by mouth if individual is drowsy or unconscious, place individual on left side with head down. Consult with a physician or poison control center whether to induce vomiting. Do not leave individual unattended.
- Additional Information**..... Pre-existing disorders of skin and lungs may be aggravated with exposure to material.

**Section 05 - Fire Fighting**

- Conditions of Flammability**..... Not considered flammable
- Means of Extinction**..... Water; carbon dioxide, foam and powder extinguisher.
- Flash Point**..... Not applicable
- Auto-ignition Temperature**..... Not available
- Upper Flammable Limit** ..... Not applicable
- Lower Flammable Limit**..... Not applicable



**Hazardous Combustible Products...** May form carbon dioxide, carbon monoxide, various hydrocarbons.

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

**Explosion Hazards.....** Material is not considered flammable but residue may burn in presence of a strong ignition source after water has evaporated.

**Section 06 - Accidental Release Measures**

**Leak / Spill.....** Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers. Cover spill with soda ash and discard waste into plastic or plastic lined containers. Flush are 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.

**Storage Requirements.....** Store in a cool, dry area away from ignition source.

**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.....** Wear a NIOSH-approved respirator for acid vapour.

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

**Clothing.....** Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.

**Footwear.....** Impervious boots of chemically resistant material should be worn.



### 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**..... Not available

## Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Characteristic odor; colorless to pale yellow liquid
- Odor Threshold**..... Not available
- Specific Gravity (Water=1)**..... 1.24-1.26
- Vapor Pressure (mm Hg, 20C)**..... Not available
- Vapor Density (Air=1)**..... Not available
- Evaporation Rate**..... < 1(butyl acetate=1)
- Boiling Point**..... >100°C
- Freeze/Melting Point**..... -10-15°C
- pH**..... Not available
- Water/Oil Distribution Coefficient**.... Not available
- Bulk Density**..... Not available
- % Volatiles by Volume**..... Not available
- Solubility in Water**..... Complete
- Molecular Formula**..... Not available
- Molecular Weight**..... Not available



**Section 10 - Stability and Reactivity**

**Stability**..... Stable under normal conditions.

**Incompatibility**..... Reactive metals (iron, zinc, aluminum), metallic nitrates, strong oxidizers and alkalies.

**Hazardous Products of Decomposition**.. Not available

**Polymerization**..... Hazardous polymerization will not occur.

**Section 11 - Toxicological Information**

**Irritancy**..... Not available

**Sensitization**..... Not available

**Chronic/Acute Effects**..... Product may cause burns with prolonged contact.

**Synergistic Materials**..... Not available

**Animal Toxicity Data**..... Not available

**Carcinogenicity**..... Not available

**Reproductive Toxicity**..... Not available

**Teratogenicity**..... Not available

**Mutagenicity**..... Not available

**Section 12 - Ecological Information**

**Fish Toxicity**..... Not available

**Biodegradability**..... Not available

**Environmental Effects**..... Not available

**Section 13 - Disposal Consideration**

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



## Section 14 - Transportation Information

### TDG Classification

Class..... 8

Group..... III

PIN Number..... UN 1760

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

## Section 15 - Regulatory Information

WHMIS Classification.....E

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

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for pH adjustment at a maximum dosage of: 250mg/L (NOTE: product is also NSF certified for use off-line as a membrane cleaner)

## 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.

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Phone: 306-664-2522





**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

<b>Location</b>	<b>Address</b>	<b>Postal Code</b>	<b>Phone Number</b>	<b>Fax Number</b>
Richmond, BC	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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

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

**Product Identifier** ..... Fluorosilicic Acid

**Product Use** ..... Water fluoridation and wood preservation.

**Supplier Name**..... ClearTech Industries Inc.  
2303 Hanselman Avenue  
Saskatoon SK S7L 5Z3  
Canada

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

**Preparation Date**..... February 8, 2011

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

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

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

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

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



### Section 03 - Hazard Identification

- Inhalation**..... Irritating to nose, throat, and respiratory system. May be corrosive to respiratory system with prolonged contact. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.
- Skin Contact / Absorption**..... May cause irritation, redness or swelling with contact.
- Eye Contact**..... Contact may cause severe irritation, watering, redness and swelling.
- Ingestion**..... May cause nausea, vomiting, abdominal pain and burns if ingested.
- Exposure Limits**..... ACGIH-TLV: 2.5mg/m<sup>3</sup> (as F)  
OSHA-PEL: 2.5mg/m<sup>3</sup> (as F)

### Section 04 - First Aid Measures

- Inhalation**..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek medical attention if difficulties persist.
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.
- Eye Contact**..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention
- Ingestion**..... Do not induce vomiting. Give large amounts of water. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.
- Additional Information**..... Beware of late onset pulmonary edema for up to 48 hours. Treat severe burns as per hydrofluoric acid exposure with a calcium gluconate jelly.

### Section 05 - Fire Fighting

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



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

**Auto-ignition Temperature**..... Not applicable

**Upper Flammable Limit** ..... Not applicable

**Lower Flammable Limit**..... Not applicable

**Hazardous Combustible Products**... Corrosive fumes of hydrogen fluoride and silicon tetrafluoride will occur when decomposition occurs 105°C.

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

**Explosion Hazards**..... Not available

**Section 06 - Accidental Release Measures**

**Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers and surface water. Dike spill area with sand or earth.

**Deactivating Materials**..... Small spills can be neutralized with hydrated lime.

**Section 07 - Handling and Storage**

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

**Storage Requirements**..... Store in a cool, dry, well-ventilated place. Keep container tightly closed, and away from incompatible materials. Do not store in glass or stoneware. Most metals are incompatible so avoid contact.

**Section 08 - Personal Protection and Exposure Controls**

**Protective Equipment**

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



- Respiratory**..... A NIOSH approved cartridge respirator with full-face shield. Chemical cartridge should provide protection against acid fumes (hydrogen fluoride). For concentrations greater than 20ppm, a NIOSH approved self-contained breathing apparatus with full-face shield should be used.
- Gloves**..... Impervious gloves of chemically resistant material (rubber or neoprene) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

### Engineering Controls

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

## Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Colourless to pale yellow liquid with a pungent odour
- Odor Threshold**..... Not available
- Specific Gravity (Water=1)**..... 1.234 at 15.6°C and 24% concentration
- Vapor Pressure (mm Hg, 20C)**..... 218 at 75°C
- Vapor Density (Air=1)**..... Not available
- Evaporation Rate**..... Not available
- Boiling Point**..... 105°C
- Freeze/Melting Point**..... -15°C
- pH**..... Approximately 1.0
- Water/Oil Distribution Coefficient**.... Not available
- Bulk Density**..... 10.29lbs/gal at 25% concentration



**% Volatiles by Volume**..... Not available

**Solubility in Water**..... Completely miscible

**Molecular Formula**.....  $\text{H}_2\text{SiF}_6$

**Molecular Weight**..... 144.08

## Section 10 - Stability and Reactivity

**Stability**..... Stable under normal conditions.

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

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

**Polymerization**..... Will not occur

## Section 11 - Toxicological Information

**Irritancy**..... Product is corrosive.

**Sensitization**..... Not available

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

**Synergistic Materials**..... Not available

**Animal Toxicity Data**.....  $\text{LD}_{50}$ (oral, guinea pig): 200mg/kg

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

**Reproductive Toxicity**..... Not available

**Teratogenicity**..... Not available



Mutagenicity..... Not available

**Section 12 - Ecological Information**

Fish Toxicity..... Not available

Biodegradability..... Not available

Environmental Effects..... Not available

**Section 13 - Disposal Consideration**

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

**Section 14 - Transportation Information**

**TDG Classification**

Class..... 8

Group..... II

PIN Number..... UN 1778

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

**Section 15 - Regulatory Information**

WHMIS Classification.....E, D1

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

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for fluoridation at a maximum dosage of 6mg/L.

**Section 16 - Other Information**

**Note:** The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages



incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

**Attention: Receiver of the chemical goods / MSDS coordinator**

As part of our commitment to the Canadian Association of Chemical Distributors (CACD) Responsible Distribution® initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

**ClearTech Industries Inc. - Locations**

**Corporate Head Office: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3**

**Phone: 306-664-2522**

**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

<b>Location</b>	<b>Address</b>	<b>Postal Code</b>	<b>Phone Number</b>	<b>Fax Number</b>
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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



# MATERIAL SAFETY DATA SHEET

## Sodium Hydroxide Solution

### Section 01 - Chemical And Product And Company Information

**Product Identifier** ..... Sodium Hydroxide Solution (4-50%)

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

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

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

**Preparation Date**..... June 30, 2010

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



### Section 02 - Composition / Information on Ingredients

**Hazardous Ingredients**..... Sodium Hydroxide </= 50%

**CAS Number**..... Sodium Hydroxide 1310-73-2

**Synonym (s)**..... Caustic soda, sodium hydrate, lye, liquid caustic, caustic

### Section 03 - Hazard Identification

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



- Skin Contact / Absorption**..... Severe burning, frequently deep ulcerations and ultimate scarring. Destructive effect on tissues.
  
- Eye Contact**..... Instantaneous painful irritation of the eyes. Can penetrate deeply causing irritation or severe burns depending on the concentration and duration of exposure. In severe cases, ulceration and blindness may occur.
  
- Ingestion**..... Burning of the mouth, throat, and esophagus; vomiting; diarrhea; edema; swelling of larynx; and subsequent suffocation. Perforation of gastrointestinal tract can occur.
  
- Exposure Limits**..... ACGIH/TLV-TWA: 2mg/m<sup>3</sup> (8 hrs)

**Section 04 - First Aid Measures**

- Inhalation**..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek immediate medical attention.
  
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.
  
- Eye Contact**..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention
  
- Ingestion**..... Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Give a cup of water to dilute chemical in stomach. If vomiting occurs, give another cup of water after vomiting. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.
  
- Additional Information**..... Not available

**Section 05 - Fire Fighting**

- Conditions of Flammability**..... Non-flammable. Reaction with metals may generate explosive hydrogen gas.
  
- Means of Extinction**..... Product does not burn. Where fire is involved, use any fire fighting agent appropriate for surrounding material; use water spray to cool fire-exposed surfaces.
  
- Flash Point**..... Not applicable



**Auto-ignition Temperature**..... Not applicable

**Upper Flammable Limit** ..... Not applicable

**Lower Flammable Limit**..... Not applicable

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

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

**Explosion Hazards**..... Not available

**Section 06 - Accidental Release Measures**

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

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

**Section 07 - Handling and Storage**

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

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

## Section 08 - Personal Protection and Exposure Controls

### Protective Equipment

- Eyes**..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.
- Respiratory**..... NIOSH-approved respirator for dust and mist should be worn, if needed (ie: when pouring large quantities through the air without local exhaust).
- Gloves**..... Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

### Engineering Controls

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

## Section 09 - Physical and Chemical Properties

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



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

**pH**..... 14

**Water/Oil Distribution Coefficient**.... Not available

**Bulk Density**..... Not available

**% Volatiles by Volume**..... Not available

**Solubility in Water**..... Completely miscible

**Molecular Formula**..... NaOH

**Molecular Weight**..... 40.00

### Section 10 - Stability and Reactivity

**Stability**..... Stable under normal conditions.

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

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

**Polymerization**..... Will not occur

### Section 11 - Toxicological Information

**Irritancy**..... Corrosive, severe irritant.

**Sensitization**..... Not available

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

**Synergistic Materials**..... Not available

**Animal Toxicity Data**..... LD<sub>50</sub>(Intraperitoneal, Mice): 40mg/kg (50%)

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

**Reproductive Toxicity**..... Not available



Teratogenicity..... Not available

Mutagenicity..... Not available

**Section 12 - Ecological Information**

Fish Toxicity..... Not available

Biodegradability..... Not biodegradable

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

**Section 13 - Disposal Consideration**

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

**Section 14 - Transportation Information**

**TDG Classification**

Class..... 8

Group..... II

PIN Number..... UN1824

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

**Section 15 - Regulatory Information**

WHMIS Classification.....E

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

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for corrosion and scale control and pH adjustment at a maximum dosage for the following:

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



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

### Section 16 - Other Information

**Note:** The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

**Attention: Receiver of the chemical goods / MSDS coordinator**

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**ClearTech Industries Inc. - Locations**

**Corporate Head Office: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3**

**Phone: 306-664-2522**

**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

<b>Location</b>	<b>Address</b>	<b>Postal Code</b>	<b>Phone Number</b>	<b>Fax Number</b>
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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



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

**Product Identifier** ..... Sodium Bisulphite 38%, Sodium Bisulphite Solution

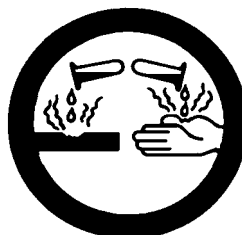
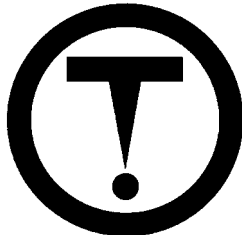
**Product Use** ..... Manufacturing of perfume, pharmaceuticals, photochemicals, bleaching agent, and papermaking

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

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

**Preparation Date**..... June 29, 2010

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

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

**Hazardous Ingredients**..... Sodium Bisulphite 30-44%

**CAS Number**..... Sodium Bisulphite 7631-90-5

**Synonym (s)**..... Sodium hydrosulphite, sodium hydrogen sulphite

**Section 03 - Hazard Identification**

**Inhalation**..... Product is irritating to nose, throat and respiratory tract.

**Skin Contact / Absorption**..... Skin contact causes irritation with reddening, swelling, rash, scaling and/or blistering.



**Eye Contact**..... Vapours from this product are irritating to the eyes. This product causes irritation, redness and pain. Corneal damage and conjunctivitis may result from eye contact with this product.

**Ingestion**..... May cause nausea, gastrointestinal upset, abdominal pain, central nervous system depression, vomiting, diarrhea, violent colic and death.

**Exposure Limits**..... ACGIH/TLV: 5mg/m<sup>3</sup>  
NIOSH/REL: 5mg/m<sup>3</sup>  
OSHA/PEL: 5mg/m<sup>3</sup>

**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 persist.

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

**Ingestion**..... Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Give two glasses of water. Do not give anything by mouth to an unconscious or convulsing person. Immediately call the local poison control center or hospital.

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

**Section 05 - Fire Fighting**

**Conditions of Flammability**..... Non-flammable

**Means of Extinction**..... For small fires use carbon dioxide or dry chemical. For large fires involving sodium bisulphite, flood fire area with water. Do not get the solid stream of water on spilled material.

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

**Auto-ignition Temperature**..... Not applicable

**Upper Flammable Limit** ..... Not applicable



**Lower Flammable Limit**..... Not applicable

**Hazardous Combustible Products**... Heating causes thermal decomposition, which liberates toxic fumes of sulfur dioxide, and corrosive fumes of nitrogen oxide and nitric acid. Reaction with some metals produces hydrogen gas.

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

**Explosion Hazards**..... Non-explosive

**Section 06 - Accidental Release Measures**

**Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Prevent material from entering sewers.

For small spills, dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container.

For larger spills, remove all ignition sources. Prevent liquid from entering sewers or waterways and dike with inert material (sand, earth, etc.). Stop Collect into containers for reclamation or disposal only if container is suitable to withstand the material. Consider insitu neutralization and disposal.

**Deactivating Materials**..... Dilute solutions of the following: sodium hydroxide, sodium carbonate (soda ash), ammonium hydroxide, hydrated lime.

**Section 07 - Handling and Storage**

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

**Storage Requirements**..... Store in corrosion-proof area away from incompatible substances. Store in tightly closed container, preferably the supplier container. Store in a cool, well ventilated location away from heat, sparks and flames. Storage tanks should be constructed from polyethylene, polypropylene, fiberglass-reinforced plastic (FRP), cross-linked polyethylene (XLPE), or 316 stainless steel to avoid corrosion problems. Tanks should be vented into an alkaline fume recovery system or scrubber. Storage tanks should be protected from water ingress, and maintained structurally in a safe and reliable condition. Store above freezing point. Ideal storage temperatures are between 20°C-27°C.



## Section 08 - Personal Protection and Exposure Controls

### Protective Equipment

- Eyes**..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.
- Respiratory**..... A NIOSH/MSHA approved air-purifying respirator equipped with acid gas/fume, dust, mist cartridges for concentrations up to 50mg/m<sup>3</sup> or 20ppm as sulfur dioxide. A powered air-purifying respirator with acid gas cartridges for up to 50ppm sulfur dioxide. A full-facepiece air-supplied respirator if concentrations are for up to and higher than 100ppm sulfur dioxide.
- Gloves**..... Impervious gloves of chemically resistant material (rubber, neoprene, vinyl or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

### Engineering Controls

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

## Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Clear yellow liquid. Pungent odour of sulfur dioxide
- Odor Threshold**..... Not available
- Specific Gravity (Water=1)**..... 1.33
- Vapor Pressure (mm Hg, 20C)**..... 78mm Hg @ 20°C
- Vapor Density (Air=1)**..... Not available



Evaporation Rate..... Not available  
Boiling Point..... 104°C  
Freeze/Melting Point..... 6°C  
pH..... 3.8-5.2  
Water/Oil Distribution Coefficient.... Not available  
Bulk Density..... Not available  
% Volatiles by Volume..... Not available  
Solubility in Water..... Completely miscible  
Molecular Formula..... NaHSO<sub>3</sub>  
Molecular Weight..... 60.86353

**Section 10 - Stability and Reactivity**

Stability..... Stable under normal conditions. Slowly evolves sulfur dioxide under ambient temperatures.  
Incompatibility..... Reacts with strong oxidizers, Lewis acids, and mineral acids. Decomposes with heat.  
Hazardous Products of Decomposition.. Sulfur dioxide released upon heating.  
Polymerization..... Will not occur

**Section 11 - Toxicological Information**

Irritancy..... High irritancy  
Sensitization..... Not available  
Chronic/Acute Effects..... Breathing fumes may aggravate existing pulmonary disease such as asthma, emphysema, and bronchitis.  
Synergistic Materials..... Not available  
Animal Toxicity Data..... LD<sub>50</sub>(oral, rat): 2000mg/kg



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

**Reproductive Toxicity**..... Not available

**Teratogenicity**..... Not available

**Mutagenicity**..... Not available

**Section 12 - Ecological Information**

**Fish Toxicity**..... LC<sub>50</sub>(96 hrs, mosquito fish): 240ppm

**Biodegradability**..... Not available

**Environmental Effects**..... Harmful to aquatic life in low concentrations.

**Section 13 - Disposal Consideration**

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

**Section 14 - Transportation Information**

**TDG Classification**

**Class**..... 8

**Group**..... III

**PIN Number**..... UN 2693

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

**Section 15 - Regulatory Information**

**WHMIS Classification**.....D2, E

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

**NSF Certification**.....Product is certified under NSF/ANSI Standard 60 for dechlorination and antioxidant at a maximum dosage of 50mg/L .



## Section 16 - Other Information

**Note:** The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations.

### **Attention: Receiver of the chemical goods / MSDS coordinator**

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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: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3**

**Phone: 306-664-2522**

**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

<b>Location</b>	<b>Address</b>	<b>Postal Code</b>	<b>Phone Number</b>	<b>Fax Number</b>
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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

**MATERIAL SAFETY DATA SHEET****Sodium Hypochlorite 5-20%****Section 01 - Chemical And Product And Company Information**

**Product Identifier** ..... Sodium Hypochlorite (5-20%)

**Product Use** ..... Disinfectant, bleaching agent, source of available chlorine, deodorizer.

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

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

**Preparation Date** ..... December 22, 2010

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

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

**Hazardous Ingredients** ..... Sodium Hypochlorite 4.90-16.80%

**CAS Number** ..... Sodium Hypochlorite 7681-52-9

**Synonym (s)** ..... Industrial bleach, hypo, bleach, Javel water, household bleach

**Section 03 - Hazard Identification**

**Inhalation** ..... Irritant of the nose and throat, causing coughing, difficulty breathing, and pulmonary edema.





- Skin Contact / Absorption**..... Causes severe skin irritation with blistering and ulceration.
- Eye Contact**..... Causes severe irritation of the mucous membranes of the eyes. May cause severe eye damage.
- Ingestion**..... Burning of the mouth and throat, abdominal cramps, nausea, vomiting, diarrhea, shock. May lead to convulsions, coma, and even death.
- Exposure Limits**..... ACGIH/TLV-TWA: 0.5ppm (chlorine)

**Section 04 - First Aid Measures**

- Inhalation**..... Remove victim to fresh air. Give artificial respiration only if breathing has stopped. If breathing is difficult, give oxygen. Seek immediate medical attention.
- Skin Contact / Absorption**..... Remove contaminated clothing. Wash affected area with soap and water. Seek medical attention if irritation occurs or persists.
- Eye Contact**..... Flush immediately with water for at least 20 minutes. Forcibly hold eyelids apart to ensure complete irrigation of eye tissue. Seek immediate medical attention.
- Ingestion**..... Do not induce vomiting. If vomiting occurs, lean victim forward to prevent breathing in vomitus. Give large amounts of water. Do not give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention.
- Additional Information**..... Not available

**Section 05 - Fire Fighting**

- Conditions of Flammability**..... Non-flammable
- Means of Extinction**..... Product does not 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**... Decomposition may produce chlorine gas and/or hydrogen chloride gas.
- Special Fire Fighting Procedures**..... Wear NIOSH-approved self-contained breathing apparatus and protective clothing.
- Explosion Hazards**..... Pressure buildup in containers could result in an explosion when heated or in contact with acidic fumes. Vigorous reaction with oxidizable organic materials may result in a fire.

**Section 06 - Accidental Release Measures**

- Leak / Spill**..... Wear appropriate personal protective equipment. Ventilate area. Stop or reduce leak if safe to do so. Restrict access to spill area until clean up is complete. Prevent material from entering sewers, waterways or confined spaces. Soak up smaller spills with absorbent material that does not react with spilled material. Flush with water to remove any residue.
- Deactivating Materials**..... Spills can be carefully neutralized first with sodium sulphite, sodium metabisulphite or other dechlorination agent for no chlorine residual, then a pH adjustment may be required with hydrochloric acid until the pH is 7. Note neutralization reactions may produce heat so necessary precautions must be taken. Local regulatory agencies should also be contacted for proper disposal.

**Section 07 - Handling and Storage**

- Handling Procedures**..... Use proper equipment for lifting and 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. Venting of containers is advisable.

**Section 08 - Personal Protection and Exposure Controls**

**Protective Equipment**

- Eyes**..... Chemical goggles, full-face shield, or a full-face respirator is to be worn at all times when product is handled. Contact lenses should not be worn; they may contribute to severe eye injury.
- Respiratory**..... A NIOSH-approved respirator suitable for chlorine is recommended. Where a higher level of protection is required, use a self-contained breathing apparatus.



- Gloves**..... Impervious gloves of chemically resistant material (rubber or PVC) should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Clothing**..... Body suits, aprons, and/or coveralls of chemical resistant material should be worn at all times. Wash contaminated clothing and dry thoroughly before reuse.
- Footwear**..... Impervious boots of chemically resistant material should be worn at all times.

### Engineering Controls

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

## Section 09 - Physical and Chemical Properties

- Physical State**..... Liquid
- Odor and Appearance**..... Strong chlorine odour. Clear, greenish-yellow solution.
- Odor Threshold**..... Not available
- Specific Gravity (Water=1)**..... 1.17 at 20°C (12% trade)
- Vapor Pressure (mm Hg, 20C)**..... 12.1mm Hg at 20°C (12.5 wt %)
- Vapor Density (Air=1)**..... Not available
- Evaporation Rate**..... Not available
- Boiling Point**..... Slowly decomposes above 40°C.
- Freeze/Melting Point**..... ~ -15°C (12% trade)
- pH**..... < 12
- Water/Oil Distribution Coefficient**.... Not available
- Bulk Density**..... Not available
- % Volatiles by Volume**..... Not available



Solubility in Water..... Complete

Molecular Formula..... NaOCl

Molecular Weight..... 74.44

### Section 10 - Stability and Reactivity

Stability..... Unstable at temperatures above 40°C, in sunlight, and in contact with acid.

Incompatibility..... Incompatible with strong acids, ammonia, oxidizable materials, nickel, copper, tin, manganese, and iron.

Hazardous Products of Decomposition.. Chlorine (by reaction with acids), oxygen (by reaction with nickel, copper, tin, manganese, iron), sodium chloride, sodium chlorate, with increased temperature.

Polymerization..... Will not occur

### Section 11 - Toxicological Information

Irritancy..... Strong irritant

Sensitization..... Not available

Chronic/Acute Effects..... If over-exposed to the solution, there will be constant irritation of the eyes, nose, and throat.

Synergistic Materials..... Not available

Animal Toxicity Data..... LD<sub>50</sub>(oral, rat): 8910mg/kg (undiluted sodium hypochlorite)

Carcinogenicity..... Not considered to be carcinogenic (IARC and ACGIH).

Reproductive Toxicity..... Not available

Teratogenicity..... Not available

Mutagenicity..... Not available

### Section 12 - Ecological Information

Fish Toxicity..... Not available



Biodegradability..... Not available

Environmental Effects..... Not available

**Section 13 - Disposal Consideration**

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

**Section 14 - Transportation Information**

**TDG Classification**

Class..... 8 (not regulated at solutions below 7%)

Group..... III (not regulated at solutions below 7%)

PIN Number..... UN 1791(not regulated at solutions below 7%)

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

**Section 15 - Regulatory Information**

WHMIS Classification.....E

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

NSF Certification.....Product is certified under NSF/ANSI Standard 60 for disinfection and oxidation at a maximum dosage for the following:

- sodium hypochlorite 5%: 200mg/L
- sodium hypochlorite 6%: 175mg/L
- sodium hypochlorite 7%: 161mg/L
- sodium hypochlorite 8%: 146mg/L
- sodium hypochlorite 9%: 131mg/L
- sodium hypochlorite 10%: 116mg/L
- sodium hypochlorite 11%: 101mg/L
- sodium hypochlorite 12%: 87mg/L
- sodium hypochlorite 13%: 82mg/L
- sodium hypochlorite 14%: 76mg/L
- sodium hypochlorite 15%: 70mg/L
- sodium hypochlorite 16%: 66mg/L
- sodium hypochlorite 17%: 62mg/L
- sodium hypochlorite 18%: 58mg/L
- sodium hypochlorite 19%: 54mg/L
- sodium hypochlorite 20%: 50mg/L



**Sanitizer Use:** to obtain 10 liters of a 200 mg/L solution as available chlorine, use 16.7 mL of Hypochlor-12 for each 10 liters of clean, potable water.

### Section 16 - Other Information

**Note:** The 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<sup>®</sup> initiative, ClearTech Industries Inc. and its associated companies require, as a condition of sale, that you forward the attached Material Safety Data Sheet(s) to all affected employees, customers, and end-users. ClearTech will send any available supplementary handling, health, and safety information to you at your request.

If you have any questions or concerns please call our customer service or technical service department.

### ClearTech Industries Inc. - Locations

**Corporate Head Office: 2302 Hanselman Avenue, Saskatoon, SK, S7L 5Z3**

**Phone: 306-664-2522**

**Fax: 306-665-6216**

**[www.ClearTech.ca](http://www.ClearTech.ca)**

Location	Address	Postal Code	Phone Number	Fax Number
Richmond, B.C.	12431 Horseshoe Way	V7A 4X6	604-272-4000	604-272-4596
Calgary, AB.	5516E - 40 <sup>th</sup> St. S.E.	T2C 2A1	403-279-1096	403-236-0989
Edmonton, AB.	11750 - 180 <sup>th</sup> Street	T5S 1N7	780-452-6000	780-452-4600
Saskatoon, SK.	2302 Hanselman Avenue	S7L 5Z3	306-933-0177	306-933-3282
Regina, SK.	555 Henderson Drive	S42 5X2	306-721-7737	306-721-8611
Winnipeg, MB.	340 Saulteaux Crescent	R3J 3T2	204-987-9777	204-987-9770
Mississauga, ON.	7480 Bath Road	L4T 1L2	905-612-0566	905-612-0575

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