Safety Data Sheet (SDS)
HYDROBROMIC ACID

Section 1: Product and Company Identification

Product Name:	HYDROBROMIC ACID	**Index Number:**	035-002-01-8

Product Number(s):

S020801, S020801-SSEF01, S020801-SSEF02, S020801-SSEF03, S020801-SSEF04, S020801-SSEF05, S020801-SSEF06, S020801-SSEF07, S020801-SSEF08, S020801-SSNF01, S020801-SSNF02, S020801-SSNF03, S020801-SSNF04, S020801-SSNF05, S020801-SSNF06, S020801-SSNF07, S020801-SSNF08, S020801-SSRF01, S020801-SSRF02, S020801-SSRF03, S020801-SSRF04, S020801-SSRF05, S020801-SSRF06, S020801-SSRF07, S020801-SSRF08, S050801, S050801-SSEF01, S050801-SSEF02, S050801-SSEF03, S050801-SSEF04, S050801-SSEF05, S050801-SSEF06, S050801-SSEF07, S050801-SSEF08, S050801-SSNF01, S050801-SSNF02, S050801-SSNF03, S050801-SSNF04, S050801-SSNF05, S050801-SSNF06, S050801-SSNF07, S050801-SSNF08, S050801-SSRF01, S050801-SSRF02, S050801-SSRF03, S050801-SSRF04, S050801-SSRF05, S050801-SSRF06, S050801-SSRF07, S050801-SSRF08

Synonyms:	Hydrogen bromide
Chemical names:	DE Bromwasserstoffsäure; ES Ácido bromhídrico (Bromuro de hidrógeno); FR Bromure d'hydrogène (Acide bromhydrique); IT Acido bromidrico; NL Broomwaterstof

Supplier:	SEASTAR CHEMICALS Inc.		
Address:	10005 McDonald Park Road, Sidney, BC V8L 5Y2 CANADA		
Phone Number:	250-655-5880	**Fax Number:**	250-655-5888
CANUTEC (CAN):	613-996-6666		

Section 2: Hazards Identification

Emergency Overview

Appearance:	Clear, colourless to faint yellow liquid
Target Organs:	Skin, eyes, respiratory system.

GHS

Classification:	Skin corrosion – Category 1B Specific target organ toxicity, Single exposure – Category 3 Corrosive to metals – Category 1	**Pictograms:**	 GHS05  GHS07
Signal Word:	Danger		

Hazard Statements:

H314: Causes severe skin burns and eye damage.
H335: May cause respiratory irritation.
H290: May be corrosive to metals.

Precautionary Statements:

P234: Keep only in original container.
P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P264: Wash thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.
P363: Wash contaminated clothing before reuse.
P390: Absorb spillage to prevent material damage.
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.
P406: Store in corrosion resistant container with a resistant inner liner.
P501: Dispose of contents/container according to federal, regional and local government requirements.

Section 3: Composition/Information on Ingredients

CAS No.	Chemical Name	Percent	EINECS / ELINCS No.
10035-10-6	Hydrobromic acid	44-49%	233-113-0
7732-18-5	Water	Balance	231-791-2

Section 4: First Aid Measures

In case of contact:

Inhalation:	**Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the buddy system). Remove source of exposure or move person to fresh air and keep comfortable for breathing. Immediately call a Poison Centre or doctor. Specific treatment is urgent. If breathing is difficult, trained personnel should administer emergency oxygen if advised to do so by the Poison Centre or doctor. If breathing has stopped, trained personnel should begin rescue breathing or, if the heart has stopped, cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using mouth guards or shields. Note: Symptoms of pulmonary edema can be delayed up to 48 hours after exposure.**
Skin:	**Avoid direct contact. Wear chemical protective clothing, if necessary. Take off immediately all contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Rinse skin with lukewarm, gently flowing water/shower for at least 30 minutes. Immediately call a Poison Centre or doctor. Double bag, seal, label and leave contaminated clothing, shoes and leather goods at the scene for safe disposal. NOTE: Any skin contact will also involve significant inhalation exposure.**
Eye:	**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 up to 30 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a Poison Centre or doctor.**
Ingestion:	**Rinse mouth. Do NOT induce vomiting. Immediately call a Poison Centre or doctor. If vomiting occurs naturally, lie on your side in the recovery position**
Notes to Physician/Doctor:	**Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures. All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.**

Section 5: Fire Fighting Measures

Fire Hazard Summary:

Will not burn. Decomposes under intense fire conditions to form extremely flammable and potentially explosive hydrogen gas and very toxic and irritating bromine vapour. Closed containers may develop pressure on prolonged exposure to heat. Readily releases very toxic hydrogen bromide gas. The gas is much heavier than air and can easily accumulate in low-lying areas. Contact of hydrobromic acid with some metals can produce hydrogen gas. Firefighters should wear a positive pressure self-contained respirator (SCBA) and full-body encapsulating chemical protective suit.

Extinguishing Media:	Hydrobromic acid does not burn. Use extinguishing agents compatible with hydrobromic acid and appropriate for the surrounding fire. Use flooding quantities of water. Use water spray to keep fire-exposed containers cool.
Extinguishing Media to be Avoided:	Not available.
Flash Point:	Not combustible (does not burn).
Flammable (Explosive) Limits:	Lower (LFL/LEL): Not applicable; Upper (UFL/UEL): Not applicable
Autoignition Temperature:	Not applicable
Sensitivity to Mechanical Impact:	Probably not sensitive. Normally stable.
Sensitivity to Static Charge:	Not available.
Electrical Conductivity:	Not available.

Minimum Ignition Energy:	Not applicable
Combustion and Thermal Decomposition Products:	Hydrogen bromide, bromine, hydrogen.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD IDENTIFICATION – Hydrobromic acid, solution

Health:	3 – Short exposure could cause serious temporary or residual injury.
Flammability:	0 – Will not burn under typical fire conditions.
Reactivity:	0 – Normally stable, even under fire conditions, and not reactive with water.

Section 6: Accidental Release Measures

Spill Precautions:

Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Wear adequate personal protective equipment. Ventilate area. Do not use metal tools. Notify government occupational health and safety and environmental authorities.

Clean-up:

Do not touch spilled material. Prevent material from entering sewers or confined spaces. Stop or reduce leak if safe to do so.

SMALL SPILLS: Neutralize spill with alkaline material (soda ash, lime), then absorb with an inert material (e.g. vermiculite, dry sand, earth). Put material in suitable, covered, labelled containers. Flush area with water. Do not get water inside containers or on spilled material. Contaminated absorbent material may pose the same hazards as the spilled product.

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

Section 7: Handling and Storage

Handling:

This material is VERY TOXIC if inhaled and is CORROSIVE to the skin, eyes and respiratory tract. Before handling, it is very important that engineering controls are operating and that protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use. Maintenance and emergency personnel should be advised of potential hazards. Unprotected persons should avoid contact with this chemical, including contaminated equipment.

In case of leaks or spills, escape-type respiratory protective equipment should be available in the work area. Immediately report leaks, spills or ventilation failures. Be aware of typical signs and symptoms of poisoning and first aid procedures. Any signs of illness should be reported immediately to supervisory personnel. Seek medical attention for all exposures even if an exposure did not seem excessive. Symptoms of a severe exposure can be delayed.

Avoid generating vapours or mists. Prevent the release of vapours or mist into workplace air. If possible, use closed handling systems for processes involving this material. If a closed handling system is not possible, use in smallest possible amounts in a well-ventilated area, separate from the storage area. Do not use near welding operations, flames or hot surfaces.

Do not use with incompatible materials such as strong oxidizing agents (e.g. hydrogen peroxide, perchlorates), metals (e.g. steel, copper, zinc) and bases. See Section 10 for more information. Never return contaminated material to its original container. 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. Use corrosion-resistant transfer equipment when dispensing. Do not use with metal spatula or other metal items.

Inspect containers for leaks before handling. Prevent damage to containers. Label containers. Open containers carefully on a stable surface. Keep containers closed when not in use. Secondary protective containers must be used when this material is being carried. Cautiously, dispense into sturdy containers made of compatible materials. Assume that empty containers contain residues which are hazardous. Do not perform any welding, cutting, soldering, drilling or other hot work on an empty vessel, container or piping until all liquid and vapours have been cleared.

Have suitable emergency equipment for fires, spills and leaks readily available. Practice good housekeeping. Maintain handling equipment. Comply with applicable regulations.

Storage:

Store in a cool, dry, well-ventilated area, out of direct sunlight and away from heat. Keep quantity stored as small as

possible. Store away from incompatible materials, such as strong oxidizers, bases and some metals. See Section 10 for more information.

Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Keep storage area separate from work areas, eating areas and protective equipment storage. Post warning signs. Inspect periodically for damage or leaks. Avoid bulk storage indoors. Store in isolated fireproof building, if possible. Storage facilities should be made of fire-resistant materials.

Inspect all incoming containers to make sure they are properly labelled and not damaged. Inspect containers regularly for leakage or expired shelf life. Replace defective containers. Protect the label and keep it visible. Have replacement containers and labels on hand. Store in suitable, unbreakable, labelled containers (usually the shipping container). Containers which are opened must be carefully resealed and kept upright to prevent leakage. Contents are air and light sensitive. Container contents may develop pressure after prolonged exposure to heat. Drums may need to be vented. Venting should only be performed by trained personnel. Handling swollen drums requires special procedures and equipment. Keep empty containers in separate storage area. Empty containers may contain hazardous residues. Keep closed.

Contain spills or leaks by storing in trays made from compatible materials. Keep absorbents for leaks and spills readily available. Have appropriate fire extinguishers and spill clean-up equipment in storage area.

Section 8: Exposure Controls/Personal Protection

General Exposure Precautions:

NOTE: Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

Engineering Controls:

Engineering methods to control hazardous conditions are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification (e.g. substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required.
Because of the high potential hazard of this material, stringent control measures such as enclosure (closed handling system) or isolation may be necessary, particularly where there is large-scale use of this material. If a closed handling system is not possible, local exhaust ventilation should be used. Use a corrosion-resistant ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust systems.

Personal Protective Equipment:

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

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.

Eye / Face protection:	Wear chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. A face shield may also be necessary.
Skin protection:	Wear impervious gloves and appropriate protective clothing. Choose body protection according to the amount and concentration of the substance at the work place. A chemical protective acid-resistant full-body encapsulating suit and respiratory protection may be required in some operations. Have a safety shower/eye-wash fountain readily available in the immediate work area.
Resistance of Materials for Protective Clothing:	GUIDELINES FOR HYDROBROMIC ACID 30-70%: RECOMMENDED (resistance to breakthrough longer than 8 hours): Barrier™(PE/PA/PE), Tychem™ Responder™ RECOMMENDED (resistance to breakthrough longer than 4 hours): Natural rubber, Neoprene rubber, Nitrile rubber, Polyvinyl alcohol

	NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): Polyvinyl chloride (PVC)
Inhalation / Ventilation:	Use in a chemical fume hood. Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister (US) or type E–P2 (EN 141) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Personal Hygiene:	Remove contaminated clothing promptly. Keep contaminated clothing in closed containers. Discard or launder before rewearing. Inform laundry personnel of contaminant's hazards. Do not eat or drink in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping.

EXPOSURE GUIDELINES – Listed under Hydrogen bromide, as HBr	
NIOSH:	REL-C: 3 ppm (10 mg/m^3); IDLH: 30 ppm
ACGIH (TLV):	TLV-C: 2 ppm, upper respiratory tract irritation
OSHA (PELs):	PEL-C: 3 ppm (10 mg/m^3); PEL-T-TWA: 3 ppm (10 mg/m^3)

Section 9: Physical and Chemical Properties

Form:	Liquid	**Melting/Freezing Point:**	47.6% w/w: -11 °C (12.2 °F)
Color:	Colourless to slight yellow	**Boiling Point:**	47.6% w/w: 124.3 °C (255.7 °F)
Odour:	Strong odour	**pH:**	1 (0.1M solution); 0 (1M) (calc.)
Odour Threshold:	2 ppm	**Density:**	47.6% w/w: 1.48 g/mL 50% w/w: 1.51 g/mL
Chemical Formula:	HBr	**Solubility:**	193 g/100 mL H_2O
Molecular Weight:	80.912 g/mol	**Vapour Pressure:** (Partial pressure)	48% w/w: 0.012 kPa (0.09 mm Hg) @ 20 °C; 0.017 kPa (0.13 mm Hg) @ 25 °C
Vapour Density:	47% w/w: 1.7 (air=1)		

Section 10: Stability and Reactivity

Normally stable. Forms bromine on standing, by air oxidation or exposure to light.

Incompatibility – Materials to Avoid:

NOTE: Chemical reactions that could result in a hazardous situation (e.g. generation of flammable or toxic chemicals, fire or detonation) are listed here. Many of these reactions can be done safely if specific control measures (e.g. cooling of the reaction) are in place. Although not intended to be complete, an overview of important reactions involving common chemicals is provided to assist in the development of safe work practices.

STRONG OXIDIZING AGENTS (e.g. hydrogen peroxide, perchlorates, potassium permanganate) - react to give off very toxic bromine.

BASES (e.g. sodium hydroxide, potassium hydroxide, amines) - react violently generating heat and pressure.

METALS (e.g. steel, copper, brass or zinc) - react to generate extremely flammable hydrogen gas and very toxic bromine vapours.

FLUORINE - react producing flame.

ACETYLIDES, BORIDES, CARBIDES, SILICIDES - may react producing flammable gas (e.g. acetylene).

Conditions to avoid:	Light, air, excess heat.
Hazardous Decomposition Products:	Bromine, hydrogen.
Hazardous Polymerization:	None reported.

Corrosivity to Metals:

Hydrobromic acid is corrosive to most metals, including stainless steel (e.g. 300 series and 400 series), aluminum (e.g. types 3003 and Cast B-36), carbon steel (e.g. types 1010, 1020 and 1075), cast iron, nickel, nickel-base alloys, Monel, Hastelloy D, Incolloy and Inconel, copper, silicon bronze, aluminum bronze, naval brass and zinc. It is not corrosive to Hastelloy B, Hastelloy C, tantalum and titanium.

Corrosivity to Non-Metals:

Hydrobromic acid attacks plastics, like nylon, acrylonitrile-butadiene-styrene (ABS), polyetherether ketone (PEEK), rigid polyurethane, polybutylene

terephthalate and polyethylene terephthalate; and elastomers, like nitrile Buna-N, neoprene, chloroprene, styrene-butadiene (SBR), polyurethane and chlorinated polyethylene. Hydrobromic acid does not attack plastics, like Teflon and other fluorocarbons, chlorinated polyvinyl chloride (CPVC), polyvinyl chloride (PVC), polypropylene, polyethylene and ethylene vinyl acetate); and elastomers, like Viton and other fluorocarbons (e.g. Chemraz and Kalrez), ethylene-propylene diene, butyl rubber, isoprene, natural rubber, and low density polyethylene.

Section 11: Toxicological Information

Potential Health Effects

Inhalation:	May be fatal if inhaled. Causes severe respiratory tract irritation and burns with sore throat, coughing and shortness of breath. May cause spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of pulmonary edema (chest pain and shortness of breath) can be delayed for up to 24 or 48 hours after exposure.
Skin:	May be fatal if absorbed through skin. Causes severe burns, blisters, ulcers and permanent scarring, depending on the concentration of the solution and the duration of contact. Any skin contact will also involve significant inhalation exposure.
Eye:	Causes severe eye burns, and permanent injury, including blindness, depending on the concentration of the solution and the duration of contact. May result in corneal injury and permanent eye damage.
Ingestion:	May be fatal if swallowed; substance poses serious aspiration hazard. Causes burns to the lips, tongue, throat, and stomach with abdominal pain, nausea, vomiting, diarrhea, hemorrhaging and permanent tissue destruction. May cause respiratory or circulatory system failure. Estimated fatal dose is 1 mL.
Chronic:	May cause effects similar to those of acute inhalation and ingestion. Repeated inhalation exposure may cause irritation of the nose and throat with mucus production. Repeated skin contact with low concentrations of hydrobromic acid solutions may cause red, dry, cracked, irritated skin (dermatitis). To the best of our knowledge, the chronic toxicity of this substance has not been fully investigated.

Effects of Long-Term (Chronic) Exposure

RTECS#:	MW3850000
LD50/LC50:	**LC50** (lethal concentration, 50% kill) Inhalation, rat – 2,858 ppm/1H ENTOX* Encyclopedia of Toxicology: Reference Book, Elsevier. **LC50** Inhalation, mouse – 814 ppm/1H ENTOX* Encyclopedia of Toxicology: Reference Book, Elsevier. **TCLo** (lowest published toxic concentration) – Inhalation, rat – 26 mg/m^3 – Sense Organs and Special Senses (Olfaction): change in sensation of smell; Lungs, Thorax or Respiration: dyspnea VCVN5* "Vrednie chemichescie veshestva. Neorganicheskie soedinenia elementov V-VII groopp".
Epidemiology:	No information found.
Teratogenicity:	No information found.
Reproductive Effects:	No information found.
Neurotoxicity:	No information found.
Mutagenicity:	No information found.
Carcinogenicity:	Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Section 12: Ecological Information

No information available.

Section 13: Disposal Considerations

Review local/regional/international regulations or requirements prior to disposal. Store material for disposal as indicated in Storage Conditions.

Contaminated packaging: Dispose of as unused product.

SDS: HYDROBROMIC ACID

Section 14: Transport Information

US DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS MATERIALS SHIPPING INFORMATION (49 CFR)

Shipping Name and Description: HYDROBROMIC ACID, with not more than 49 percent hydrobromic acid

Identification Number: UN1788 | Hazard Class or Division: 8 | Packing Group: II

CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG) SHIPPING INFORMATION

Shipping Name and Description: HYDROBROMIC ACID

UN Number: UN1788 | Class: 8 | Packing Group/Category: II

Special Provisions: --- | Marine Pollutant: --- | Passenger Carrying Road/Railway Vehicle Index: 1 kg or L

International Maritime Dangerous Goods (IMDG)

Proper Shipping Name / Description: HYDROBROMIC ACID

UN Number: 1788 | Class or Division (Sub Risk): 8 | Packing Group/Category: II

Special Provisions: --- | Marine Pollutant: --- | EMS Number: F-A, S-B

International Air Transport Association (IATA)

Proper Shipping Name / Description: Hydrobromic Acid 49% or less strength

UN/ID Number: 1788 | Class or Division (Sub Risk): 8 | Packing Group: II

Special Provisions: A3, A803 | Passenger / Cargo Aircraft: 851 Pkg Inst, 1 L Max Net | Cargo Aircraft Only: 855 Pkg Inst, 30 L Max Net

Section 15: Regulatory Information

Hydrobromic acid	CAS# 10035-10-6
US Federal:	
TSCA	Listed on the TSCA Inventory.
SARA Title III: Section 302	Not subject to the reporting requirement.
SARA Title III: Section 313	Does not exceed the threshold (De Minimis) reporting levels.
US State:	
Massachusetts Right To Know	Subject to this act, 10 lbs RQ.
Pennsylvania Right To Know	Subject to this act.
New Jersey Right To Know	Subject to this act, RTK# 1011.
California Prop. 65	Not subject to this act.
Canada	
DSL/NDSL Status:	Is listed, record number: 9306
WHMIS Classifications:	D1A – Very toxic E – Corrosive

Section 16: Other Information

Revision Date:	07-2014, Supersedes 04-2014 & 04-2011

The statements contained herein are offered for informational purposes only and are based upon technical data. SEASTAR CHEMICALS Inc. believes them to be accurate but does not purport to be all-inclusive. The above-stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (SEASTAR CHEMICALS Inc) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should make their own investigations to determine suitability of information and product for their particular purposes.