

# Material Safety Data Sheet

## HYDROCHLORIC ACID

Print Date: May 2010

### SECTION 1 – Chemical Product and Company Identification

MSDS Name: HYDROCHLORIC ACID

MSDS Preparation Date: 05-2010, Supersedes 07-2008, 02-2007, 02-2004, 02-2001 & 02-98

**Synonyms or Generic ID:** Muriatic acid, Chlorohydric acid, hydrogen chloride, spirits of salt.

**Seastar Product Codes:** S010401, S020401, S010401-SSNC03, S010401-SSEC03, S010401-SSNC04, S010401-SSEC04, S010401-SSNC06, S010401-SSEC06, S010401-SSNC09, S010401-SSEC09, S010401-SSNC41, S010401-SSEC41, S010401-SSNC61, S010401-SSEC61, S010401-SSNC63, S010401-SSEC63, S010401-SSNC65, S010401-SSEC65, S010401-SSND13, S010401-SSED13, S020401-SSNF07, S020401-SSEF07, S020401-SSNF08, S020401-SSEF08, S010401-SSNG04, S010401-SSEG04, S010401-SSNG09, S010401-SSEG09, S010401-SSNG41, S010401-SSEG41, S010401-SSNG61, S010401-SSEG61, S010401-SSNG65, S010401-SSEG65, S010401-SSNH43, S010401-SSEH43, S020401-SSNP01, S020401-SSEP01, S020401-SSNP02, S020401-SSEP02, S020401-SSNP03, S020401-SSEP03, S020401-SSNP04, S020401-SSEP04, S020401-SSNP05, S020401-SSEP05, S020401-SSNP06, S020401-SSEP06, S050401-SSNP05, S050402-SSNP05, S050402-SSNP06, S050403-SSNP05, IQ-04-0500, IQ-04-1000, IQ-04-1000HDPE, IQ-04-1000R, IQ-04-2500, IQ-04-2500-6, IQ-04-2500-S, IQ-04-25SK, IQ-04-25SK6, IQ-04-25SKS, IQ-04-4000, IQ-04-DRUM, IQ-04-200L, BA-04-0250, BA-04-0500, BA-04-1000, BA-04-1000-02N, BA-04-1000-2N, BA-04-1000-4N, BA-04-1000-6N, BA-04-1000-10N, BA-04-2000, CP-04-1000P400, CP04-1000P400, OVERFLOW-04

**Canadian TDG Classification:** 8 PKG Gr II

**Formula:** HCl

**PIN (UN# / NA#):** UN1789

**Molecular Wt:** 36.46

**Canadian WHMIS Class:** Class E; Class D Div 1 Sub A.

**Supplier:** Seastar Chemicals Inc, 10005 McDonald Park Road, Sidney, BC V8L 5Y2 CANADA

**Tel:** (250) 655-5880, **Fax:** (250) 655-5888

**CANUTEC (CAN):** (613)-996-6666

### SECTION 2 – Composition/Information on Ingredients

CAS #	Chemical Name	Percent	EINECS/ELINCS	TLV	Hazard
7647-01-0	Hydrogen chloride	20-38%	231-595-7	(Ceiling) 5 ppm (7 mg/m <sup>3</sup> ) (ACGIH)	Corrosive/Poison
7732-18-5	Water	Balance	231-791-2	Not established	N/ap

Hazard Symbols: C

Risk Phrases: 34 37

### SECTION 3 – Hazards Identification

#### EMERGENCY OVERVIEW

**Appearance:** colourless to slight yellow clear liquid. Danger! Causes eye and skin burns. Causes severe digestive tract irritation with possible burns. Repeated or prolonged exposure may cause erosion of exposed teeth. Corrosive to metal. May be fatal if inhaled or swallowed. Causes severe respiratory tract irritation with possible burns.

**Target Organs:** Respiratory system, gastrointestinal system, teeth, eyes, skin.

#### Potential Health Effects

**Primary Route(s) of Entry:** Inhalation and ingestion. Skin contact. Eye contact.

**Effects of Acute Exposure:** Harmful by ingestion, inhalation or skin absorption. May cause permanent damage.

**LD50/LC50:** CAS# 7332-18-5: Oral, rat: LD50 – >90 mL/kg.

CAS# 7647-01-0: Inhalation, mouse: LC50 = 1108 ppm/1H, Inhalation, rat: LC50 = 3124 ppm/1H, Oral, rabbit: LD50 = 900 mg/kg

**Eyes:** May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitisation to light. May cause conjunctivitis. May cause permanent damage.

**Skin:** May be absorbed through the skin in harmful amounts. Contact with liquid is corrosive and causes severe burns and ulceration. May cause photosensitization in certain individuals.

**Ingestion:** May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.

**Inhalation:** Causes severe respiratory tract inflammation. Destructive to tissues of mucous membranes. Coughing, difficulty breathing, pulmonary edema, collapse, respiratory system and lung damage, possible coma and possibly death.

**Effects of Chronic Exposure:** Erosion of the teeth, ulceration of the nose, mouth and gums, bronchitis. Target organs: skin, eyes, lungs, respiratory system. To the best of our knowledge the chronic toxicity of this substance has not been fully investigated.

## SECTION 4 – First Aid Measures

**Eyes:** Immediately flush eyes with large amounts of water for at least 30 minutes, holding lids apart to ensure flushing of the entire surface. Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed.

**Skin:** Get medical aid immediately. Immediately flush skin with copious quantities of water for at least 30 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before re-use.

**Ingestion:** Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Consult a physician immediately. Never give anything by mouth to an unconscious person.

**Inhalation:** Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician.

**Notes to Physician:** Treat symptomatically and supportively.                      **Antidote:** No specific antidote exists.

## SECTION 5 – Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Contact with metals may cause generation of flammable concentrations of hydrogen gas. Emits toxic fumes under fire conditions. Hazardous Combustion Products: Hydrogen chloride gas.

**Extinguishing Media:** Substance is non-flammable; use agent most appropriate to extinguish surrounding fire. Water spray. Carbon dioxide.

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

**Flash Point:** Does not burn.

**NFPA Rating:** Health 3; Flammability 0; Instability 1

**Explosion Limits:** Lower: Not applicable. Upper: Not applicable.

## SECTION 6 – Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Large spills may be neutralised with dilute alkaline solutions of soda ash, or lime. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite.

**Steps to be taken in case material is released or spilled:** Evacuate and ventilate the area. Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Cover with soda ash or lime. Place in a suitable container and mark for disposal. Wash spill site after material pick-up is complete.

**Waste disposal method:** According to all applicable regulations. Avoid run-off.

## SECTION 7 – Handling and Storage

**Handling:** Wash thoroughly after handling. Remove contaminated clothing and wash before re-use. Use with adequate ventilation. Do not get on skin or in eyes. Do not ingest or inhale. Do not wash down the drain. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking or food consumption while handling.

**Storage:** Keep away from heat and flame. Do not store in direct sunlight. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep tightly closed. Do not add any other material to the container.

**Storage Code:** White.

## SECTION 8 – Exposure Control/Personal Protection

**Engineering Controls:** Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

**Exposure Limits:**

<i>Chemical Name</i>	<i>ACGH</i>	<i>NIOSH</i>	<i>OSHA</i>
Hydrogen chloride	None listed.	C5 ppm; C 7 mg/m <sup>3</sup>	C5 ppm; C 7 mg/m <sup>3</sup>
Water	None listed.	None listed.	None listed.

**OSHA Vacated PELs**

**Personal Protective Equipment**

**Eyes:** Wear appropriate protective face shield and eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.

**Skin Protection:** Chemical protective gloves, coveralls, boots, and/or other chemical protective clothing to prevent all possible skin contact.

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 hydrochloric acid, less than 30%:**

RECOMMENDED (resistance to breakthrough longer than 8 hours): Butyl rubber, natural rubber, neoprene rubber, nitrile rubber, Viton(TM), Viton(TM)/Butyl rubber, Barrier (PE/PA/PE), Trelchem(TM) HPS, Trelchem(TM) VPS, Tychem(TM) SL (Saranex(TM)), Tychem(TM) CPF 3, Tychem(TM) F, Tychem(TM) BR/LV, Tychem(TM) Responder(TM), Tychem(TM) TK.

RECOMMENDED (resistance to breakthrough longer than 4 hours): Polyvinyl chloride, Silver Shield/4H(TM) (polyethylene/ethylene vinyl alcohol).

CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): Polyethylene.

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): Polyvinyl alcohol.

**Guidelines for hydrochloric acid, 37%:**

RECOMMENDED (resistance to breakthrough longer than 8 hours): Butyl rubber, Neoprene rubber, Viton(TM), Viton(TM)/Butyl rubber, Barrier (PE/PA/PE), Trelchem(TM) HPS, Trelchem(TM) VPS, Tychem(TM) SL (Saranex(TM)), Tychem(TM) CPF 3, Tychem(TM) F, Tychem(TM) BR/LV, Tychem(TM) Responder(TM), Tychem(TM) TK.

CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): Polyethylene

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): Polyvinyl alcohol

There is evidence that this material can cause serious skin injury (e.g., corrosion or skin absorption).

Recommendations are NOT valid for very thin natural rubber, neoprene, nitrile and pvc gloves (0.3 mm or less).

Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.

**Personal Hygiene:**

Remove contaminated clothing immediately. Keep contaminated clothing in closed containers. Discard or launder before re-wearing. Inform laundry personnel of contaminant's hazards. Do not eat or drink in work areas.

**Respiratory Protection:** Follow the OSHA respirator regulations found in 29CFR 1910.134. Always use a NIOSH-approved respirator when necessary. If more than TLV, do not breathe vapour. Wear self-contained breathing apparatus.

Use only in a chemical fume hood. Adequate ventilation to maintain vapour/dust below TLV.

**Ventilation:** Use only in a chemical fume hood. Adequate ventilation to maintain vapour/dust below TLV.

**Other Protective Equipment:** Make eye bath and emergency shower available.

## SECTION 9 – Physical and Chemical Properties

**Molecular Formula:** HCl

**Molecular Weight:** 36.46g/mol

**Physical State:** Liquid

**Appearance:** clear, colourless

**Odour:** strong odour – pungent odour

**Conversion Factor:** 1 ppm = 1.49 mg/m<sup>3</sup>; 1 mg/m<sup>3</sup> = 0.67 ppm @25 °C (calculated)

**Melting Point:** FREEZING POINT: -17.4 °C (0.7 °F) (10.8% hydrochloric acid); -62.25 °C (-80.1 °F) (20.7%); -46.2 °C (-51.2 °F) (31.24%); -35 °C (-31 deg F) (35.2%)

**Boiling Point:** 108.6 °C (227.4 °F) (constant boiling mixture (20.2% hydrochloric acid))

**Relative Density (Specific Gravity):** 1.023 (5% hydrochloric acid); 1.047 (10%); 1.098 (20%); 1.149 (30%); 1.179 (36%); 1.198 (38%) @20 °C; 1.096 (constant boiling mixture (20.2%)) @25 °C

**Solubility in Water:** Soluble in all proportions.

**Solubility in Other Liquids:** Very soluble in ethanol, methanol, dioxane and tetrahydrofuran; insoluble in hydrocarbons, e.g. n-hexane.

**Coefficient of Oil/Water Distribution (Partition Coefficient):** Log P(oct) = 0.3 (36% hydrochloric acid)

**pH Value:** 1.1 (0.1M (0.37%) solution); 0.1 (1M (3.65%) @25 °C

**Acidity:** Very strong acid.

**Dissociation Constant:** pKa = -6.2 @25 °C

**Viscosity-Dynamic:** 1.08 mPa.s (1.08 centipoises) (5 wt% hydrochloric acid); 1.16 mPa.s (1.16 centipoises) (10%); 1.36 mPa.s (1.36 centipoises) (20%); 1.71 mPa.s (1.71 centipoises) (30%); 2.0 mPa.s (2.0 centipoises) (36%); 2.11 mPa.s (2.11 centipoises) (38%) @20 °C

**Surface Tension:** Approximately 71.97 mN/m (71.97 dynes/cm) (dilute hydrochloric acid) at 25 deg C (2); 71.75 mN/m (71.75 dynes/cm) (17% hydrochloric acid); 70.55 mN/m (70.55 dynes/cm) (23.7%); 65.75 mN/m (65.75 dynes/cm) (35.3%) @25 °C

**Vapour Density:** 1.3 (approximately 36%) (air = 1)

**Vapour Pressure:** PARTIAL PRESSURE: 0.0005 kPa (0.004 mm Hg) (10% hydrochloric acid); 0.027 kPa (0.205 mm Hg) (20%); 1.41 kPa (10.6 mm Hg) (30%); 14.1 kPa (105.5 mm Hg) (36%); 28.0 kPa (210 mm Hg) C (38%) at 20 °C

**Saturation Vapour Concentration:** 5.2 ppm (10% hydrochloric acid); 300 ppm (20%); 13900 ppm (1.39%) (30%); 138800 ppm (13.88%) (36%); 276400 ppm (27.64%) (38%) @20 °C (calculated)

**Evaporation Rate:** Hydrochloric acid solutions of greater than 28% are very volatile and can readily release high concentrations of hydrogen chloride gas.

**Henry's Law Constant:** Hydrochloric acid water solutions do not obey Henry's law at all measured concentrations.

Other Physical Properties:

**DIELECTRIC CONSTANT:** Approximately 78.30 @25 °C

## SECTION 10 – Stability and Reactivity

**Chemical Stability:** Stable.

**Conditions to Avoid:** Incompatible materials, light.

**Incompatibilities with Other Materials:** Acetate, acetic anhydride, alcohols + hydrogen cyanide, 2-aminoethanol, ammonium hydroxide, calcium carbide, calcium phosphide, cesium acetylene carbide, cesium carbide, chlorosulfonic acid, 1,1-difluoroethylene, ethylene diamine, ethyleneimine, fluorine, lithium silicide, magnesium boride, mercuric sulfate, oleum, perchloric acid, potassium permanganate, b-propiolactone, propylene oxide, rubidium acetylene carbide, rubidium carbide, silver perchlorate + carbon tetrachloride, sodium, sodium hydroxide, sulfuric acid, uranium phosphide, vinyl acetate. Substance polymerizes on contact with aldehydes or epoxides. Reacts with most common metals to produce hydrogen. Amines, metal oxides, acetic anhydride, formaldehyde, alkalies, carbonates, strong bases, nitric acid, oxidizing agents, cyanides, sulphides, fluorides, phosphides, acetylides, bromides, carbides, silicides.

**Hazardous Decomposition Products:** Hydrogen chloride, hydrogen gas.

**Hazardous Polymerization:** HCl itself does not polymerize. Reaction of HCl with some incompatible materials can cause polymerization.

## SECTION 11 – Toxicological Information

**RTECS:** CAS# 7332-18-5: ZC0110000. CAS# 7647-01-0: MW4025000.

**LD50/LC50:** CAS# 7332-18-5: Oral, rat: LD50 = >90 mL/kg.

CAS# 7647-01-0: MW4025000. Inhalation, mouse:

LC50 = 1108 ppm/1H, Inhalation, rat: LC50 = 3124 ppm/1H, Oral, rabbit: LD50 = 900 mg/kg

**Carcinogenicity:** CAS# 7332-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65. CAS#

7647-01-0: ACGIH: Not listed. California: Not listed. NIOSH: Not listed. NTP: Not listed. OSHA: Not listed. IARC: Group 3.

**Epidemiology:** No information available.

**Teratogenicity:** Embryo or Fetus: Stunted fetus, ihl-rat TLo = 450 ml/m<sup>3</sup>/1H Specific Developmental Abnormalities: homeostasis, ihl-rat TLo = 450 mg/m<sup>3</sup>/1H.

**Reproductive:** No information available.

**Mutagenicity:** No information available.

**Neurotoxicity:** No information available.

## SECTION 12 – Ecological Information

**Ecotoxicity:** No information available.

Trout LC100=10 mg/L/24H Shrimp LC50=100-330 ppm Starfish LC50=100-330 mg/L/48-96H Shore crab LC50=240 mg/L/48H Chronic plant toxicity=100 ppm.

**Environmental:** Substance will neutralize soil carbonate-based components.

**Physical:** No information available

**Other:** None.

## SECTION 13 – Disposal Considerations

**Dispose of in a manner consistent with federal, provincial/state/territorial, and local regulations.**

RCRA D-Maximum Concentration of Contaminants: None of the components are on this list.

RCRA D Series – Chronic Toxicity Reference Levels: None of the components are on this list.

RCRA F Series Wastes: None of the components are on this list.

RCRA P Series Wastes: None of the components are on this list.

RCRA U Series Wastes: None of the components are on this list.

RCRA Substances Banned from Land Disposal: None of the components are on this list.

## SECTION 14 – Transport Information

**Proper Shipping Name:** HYDROCHLORIC ACID

**Hazard Class:** 8 **UN Number:** UN1789

**Packing Group:** II

## SECTION 15 – Regulatory Information

### US Federal

TSCA: CAS# 7332-18-5 is listed on the TSCA Inventory. CAS# 7647-01-0 is listed on the TSCA Inventory.

Health and Safety Reporting List: None of the components are on this list.

Chemical Test Rules: None of the components are on this list.

TSCA Section 12b: None of the components are on this list.

TSCA Significant New Use Rule (SNUR): None of the components are on this list.

CERCLA Reportable Quantities (RO): CAS# 7647-01-0: final RO = 5000 pounds (2270 kg).

SARA Threshold Planning Quantities (TPQ): CAS# 7647-01-0: TPQ = 500 pounds.

SARA Hazard Categories: CAS# 7647-01-0: acute.

SARA Section 313: This material contains Hydrogen chloride (CAS# 7647-01-0, 36-38%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

### US State

State Right to Know: Hydrogen chloride can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California Prop 65: No information available.

California No Significant Risk Level: No information available.

### European/International Regulations

#### European Labelling in Accordance with EC Directives:

Hazard Symbols: Risk Phrases: R37 Irritating to respiratory system. R37 Irritating to Respiratory system. Safety Phrases: S 2 Keep out of reach of children. S 3/9 Keep in a cool, well-ventilated place. S 24/25 Avoid contact with skin and eyes. S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 28A After contact with skin, wash immediately with plenty of water.

#### EUROPEAN UNION (EU) CLASSIFICATION AND LABELLING INFORMATION

This EU classification information reflects the 29th Adaptation to Technical Progress (ATP) of Council Directive 67/548/EEC. The EU has adopted the 30th ATP (2008/58/EC of 21 August 2008) and 31st ATP (2009/2/EC of 15 January 2009) of this Council Directive. See: <http://ecb.jrc.ec.europa.eu/esis> for current information.

EU Classification:

Corrosive. Causes burns. [C;R34] Irritant. Irritating to respiratory system. [Xi;R37] (19)

EU Risk Phrases:

Causes burns. Irritating to the respiratory system. [R:34-37]

EU Safety Phrases:

Keep locked up and out of the reach of children.\* In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show label where possible). [S:(1/2-)\*26-45]

\*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.

EU Comments:

NOTES RELATED TO PREPARATIONS:

The product label must indicate the percentage concentration of the solution.

CONCENTRATION GREATER THAN OR EQUAL TO 25%: Corrosive. Causes burns. Irritating to the respiratory system. [C;R34-37]

CONCENTRATION LESS THAN 25% AND GREATER THAN OR EQUAL TO 10%: Irritant. Irritating to eyes and respiratory system and skin. [Xi;R36/37/38]

Safety phrases relate to the highest concentration division indicated, but may also be applicable to lower concentrations.

WGKK (Water Danger/Protection): No information available.

Clean Air Act – Hazardous Air Pollutants (HAPs): CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP).

Clean Air Act – Class 1 Ozone Depletors: None of the components are on this list.

Clean Air Act – Class 2 Ozone Depletors: None of the components are on this list.

Clean Water Act – Hazardous Substances: CAS# 7647-01-0 is listed as a Hazardous Substance under CWA.

Clean Water Act – Priority Pollutants: None of the components are on this list.

Clean Water Act – Toxic Pollutants: None of the components are on this list.

OSHA – Highly Hazardous: CAS# 7647-01-0 is considered highly hazardous by OSHA.

**Canadian DSL/NDSL:** CAS# 7732-18-5 is listed on Canada's DSL/NDSL List. CAS# 7647-01-0 is listed on Canada's DSL/NDSL List.

**Canadian WHMIS Classification:** This product has a WHMIS classification of D1A, E.

**Canada Ingredient Disclosure List:** CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List. CAS# 7647-01-0 is listed on Canada's Ingredient Disclosure List.

**Exposure Limits:** OES-United Kingdom: STEL 5 ppm STEL; 7 mg/m<sup>3</sup> STEL.

## SECTION 16 – Other Information

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.