

Safety Data Sheet

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Identification of the substance or mixture

Product code	HYDROCHLORICACID18
Product name	HYDROCHLORIC ACID 18% SOLUTION
Chemical Name	Aqueous Hydrochloric Acid Solution
Molecular Formula	HCl + H ₂ O
Product Catalog Numbers	ACH-.5-1; ACH-1-1; ACH-2-1; ACH-5-1; PP112-01A5HA; PP113-500A3HA; PP140-40C.2HA; PP140-40CDB.2HA; PP140-40CEP.2HA; PP140-40CEP.4HA; PP140-40CEP.5HA; PP141-40A.2HA; PP141-40ADB.2HA; PP141-40AEP.2HA; PP141-40AEP.5HA; SVCH-.5-1; SVCH-1-1; SVCH-2-1; SVCH-5-1

Company/undertaking identification

EP Scientific Products/ThermoFisher
520 North Main Street
Miami, OK 74354
Business Phone: 1-(828)-658-2711

EMAIL ADDRESS FOR PRODUCT INFORMATION:
cservice@epscientific.com

24 hour Emergency Response for Hazardous Materials [or Dangerous Goods] Incident. Spill, Leak, Fire, Exposure, or Accident. Call CHEMTREC
CHEMTREC: 1-800-424-9300 (U.S./Canada/Puerto Rico) [24-hours]
CHEMTREC: +1-703-527-3887 (Outside North America) [24-hours]

Country Specific Emergency Number (if available):

Product Use: Various

SECTION 2: Hazards identification

GHS - Classification

Signal Word
WARNING

Hazard pictograms



Health hazards

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Specific target organ systemic toxicity (single exposure)	Category 3

Physical hazards

GHS Physical Hazard	Substances/mixtures corrosive to metal
GHS Physical Hazard Category Number	Category 1

Environmental hazards

Not classified

Hazard Statements

H315 - Causes skin irritation
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation
H290 - May be corrosive to metals

Precautionary Statements

Prevention

P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P264 - Wash hands thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection

Response

P302 - IF ON SKIN:
P312 - Call a POISON CENTER or doctor/physician if you feel unwell
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 + P364 - Take off all contaminated clothing and wash it before reuse
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/attention
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P390 - Absorb spillage to prevent material damage
P321 - Specific treatment (remove from exposure and treat symptoms). Refer to other portions of precautionary text on this label, SDS or other product information sheets, as appropriate.

Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P406 - Store in corrosion resistant container with a resistant inner liner

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Other hazards

Not Applicable

HMIS

Health	2
Flammability	0
Reactivity	1

EMERGENCY OVERVIEW:

Product Description: This product is a clear colorless to pale yellow liquid with strong, pungent odor.

Health Hazards: This product may cause severe irritation by all routes of exposure. Prolonged exposure may cause burns. Corrosive effect depends on concentration and duration of exposure. May be harmful or fatal if swallowed and by inhalation. Symptoms by inhalation may be delayed. Repeated inhalation of low level concentrations may cause reduced lung capacity and erosion of the teeth. Chronic skin exposure to low concentration may result in dermatitis.

Flammability Hazards: Decomposes under intense fire conditions to form extremely flammable and potentially explosive hydrogen gas and very toxic and corrosive chlorine gas. Contact with metals can generate highly flammable hydrogen gas. If involved in a fire it may generate irritating fumes and toxic gases (e.g., hydrogen chloride gas).

Reactivity Hazards: Hydrochloric Acid reacts with many Hydrochloric Acid is corrosive to many metals and contact may produce flammable hydrogen gas.

Environmental Hazards: This product may cause harm to organisms if accidentally released.

Emergency Considerations: Emergency responders should wear appropriate protection for situation to which they respond.

SECTION 3: Composition/information on ingredients

Component	CAS-No	EINECS-No	Weight %
hydrochloric acid 7647-01-0 (18)	7647-01-0	231-595-7	18

We recommend handling all chemicals with caution.

SECTION 4: First aid measures

Description of first aid measures

All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace. Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposure except minor instances of inhalation or skin contact. Take a copy of label and SDS to physician or health professional with the contaminated individual.

Skin contact

If skin contact causes irritation, flush with running water. Under running water, remove contaminated clothing, shoes, and leather goods (e.g., watchbands, belts). Transport victim to an emergency care facility immediately. Discard contaminated clothing, shoes and leather goods. DO NOT reuse. Seek medical attention if adverse effects occur after flushing.

Eye contact

Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, by the clock, while holding the eyelid(s) open. DO NOT INTERRUPT FLUSHING. Do NOT allow victim to rub eyes or keep eyes closed. Have victim "roll" eyes. Neutral saline solution may be used as soon as it is available. If necessary, keep emergency vehicle waiting. Take care not to rinse contaminated water into the non-affected eye or onto the face. Quickly transport victim to an emergency care facility.

Ingestion

If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. NEVER give anything by mouth if victim is rapidly losing consciousness, is unconscious or is convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water to dilute material in stomach. If milk is available, it may be administered AFTER the water has been given. If vomiting occurs naturally, rinse mouth and repeat administration of water. Quickly transport victim to an emergency care facility.

Inhalation

If aerosols from of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. If breathing is difficult, give oxygen. Seek medical attention if adverse effect occurs after removal to fresh air.

Notes to Physician

Treat symptomatically.

Most important symptoms and effects, both acute and delayed

H315 - Causes skin irritation H319 - Causes serious eye irritation H335 - May cause respiratory irritation H290 - May be corrosive to metals

Indication of any immediate medical attention and special treatment needed

None.

Medical conditions aggravated by exposure

Pre-existing skin or respiratory disorders may be aggravated by exposure to this product.

Extinguishing media**Suitable extinguishing media**

Use fire extinguishing materials appropriate for surrounding materials.

Unsuitable extinguishing media

No information available.

Special hazards arising from the substance or mixture

This solution is not flammable or combustible. Contact with common metals produces extremely flammable hydrogen gas. When heated or in a fire, toxic and corrosive hydrogen chloride gas is released. Hydrogen chloride is thermally stable up to approximately 1500°C (2732°F). Above this temperature, hydrogen chloride begins to dissociate into extremely flammable hydrogen gas and very toxic and corrosive chlorine gas. Heat from a fire can cause a rapid build-up of pressure inside closed containers, which may cause explosive rupture and a sudden release of large amounts of flammable and corrosive gases. Vapor is heavier than air and can accumulate in low-lying areas.

Advice for fire-fighters

Structural and incipient firefighters must wear Self-Contained Breathing Apparatus (SCBA) and full protective equipment. Evacuate area and fight fire from a safe distance or protected location. Approach fire from upwind to avoid hazardous decomposition products. Closed containers may rupture violently when exposed to the heat of fire and suddenly release large amounts of product. If possible, isolate materials not yet involved in the fire and move containers from fire area if this can be done without risk. Protect personnel. Otherwise, cool fire-exposed containers, tanks or equipment by applying hose streams. Cooling should begin as soon as possible (within several minutes) and should concentrate on any un-wetted portions of the container and continue until well after the fire is out. Apply water from the side and a safe distance. If this is not possible, use unmanned monitor nozzles and immediately evacuate the area. Use water spray in large quantities to knock down fumes. Dike fire control water for appropriate disposal. Thoroughly decontaminate all contaminated protective equipment is contaminated by washing with soapy water, prior to removal of SCBA respiratory protection. Firefighters whose protective equipment becomes contaminated should thoroughly shower with warm, soapy water and should receive medical evaluation if they experience any adverse effects.

Explosion Sensitivity to Mechanical Impact/ Explosion Sensitivity to Static Discharge

Not sensitive

Personal precautions, protective equipment and emergency procedures

Trained personnel using pre-planned procedures should respond to uncontrolled releases. In case of a spill, clear the affected area and protect people. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Avoid allowing water runoff to contact spilled material. Call CHEMTREC (1-800-424-9300) for emergency assistance. Or if in Canada, call CANUTEC (613-996-6666). The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment), if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus.

PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

Small Spills: Wear double-gloves (rubber over latex gloves), rubber apron, and splash goggles or safety glasses.

Large Spills: Trained personnel following pre-planned procedures should handle non-incident releases. Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit. Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus

Environmental precautions

Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Methods and material for containment and cleaning up

Small Spills: Absorb spilled liquid with polypads, or other suitable absorbent materials. Neutralize with sodium bicarbonate or other material appropriate for acids. Wash contaminated area with soap and water, absorb with polypads or other appropriate material, and rinse with water.

Large Spills: Absorb spilled liquid with polypads, or other suitable absorbent materials. Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Monitor area and confirm levels are below exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

All Spills: Place all spill residue in appropriate containment (see Sections 10 (Reactivity and Incompatibility) and 13 (Disposal Considerations) for information on containers that should not be used due to Hydrochloric Acid component) and seal, place in appropriate container and dispose of properly. Neutralize spill area with sodium bicarbonate or other material appropriate for acidic materials. Absorb spilled liquid with polypads, or other suitable absorbent materials. Decontaminate the area thoroughly. After all spill residue has been removed from the area, rinse the area with flooding quantities of water. Do not mix with wastes from other materials. If necessary, discard all stained response equipment or rinse with soapy water before returning such equipment to service.

Reference to other sections

See Section 13, Disposal Considerations for more information.

SECTION 7: Handling and storage

Precautions for safe handling

All employees who handle this product should be trained to handle it safely. As with all chemicals, avoid getting this product ON YOU or IN YOU. Do not eat, drink, smoke, or apply cosmetics while handling this product. Wash hands thoroughly after handling this product or equipment and containers of this compound. Follow SPECIFIC USE INSTRUCTIONS supplied with product. Avoid breathing vapors or mists generated by this product. Use in a well-ventilated location. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual liquid or vapors; therefore, empty containers should be handled with care. Corrosion of equipment and surfaces should be considered in areas where hot or misted acid is present. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Soda ash or lime should be kept nearby for emergency use.

Conditions for safe storage, including any incompatibilities

This solution is corrosive to some metals and should not be stored in drums, pails or other containers made of these materials. See Sections 10 (Reactivity and Incompatibility) and 13 (Disposal Considerations) for more information on inappropriate storage containers. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers or in a diked area, as appropriate. Keep container tightly closed when not in use. Storage areas should be made of fire and corrosion resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. If drums are swollen, contact the manufacturer/supplier immediately for assistance. Handling swollen drums requires special procedures and equipment.

Specific end use(s)

Various uses in different industries; follow all industry standards for use of this product.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT

When cleaning non-disposable equipment, wear latex or butyl rubber (double gloving is recommended), goggles, and lab coat. Wash equipment with soap and water. Wipe equipment down with damp sponge or polypad. Collect all rinsates and dispose of according to applicable Federal, State, and local procedures standards.

SECTION 8: Exposure controls/personal protection

Control parameters

Chemical Name	ACGIH-TLVs (TWA)	ACGIH-TLVs (STEL)	OSHA-PELs (TWA)	OSHA-PELs (STEL)
hydrochloric acid	Not Established	2 mg/m ³ (ceiling)	Not Established	2 ppm (ceiling)

Chemical Name	NIOSH-RELs (TWA)	NIOSH-RELs (STEL)	NIOSH (IDLH)	Other
hydrochloric acid	Not Established	5 ppm (ceiling)	50 ppm	DFG MAKs: TWA = 2 PEAK = 2•MAK 15 min. average value, 1-hr interval, 4 per shift DFG MAK Pregnancy Risk Classification: C Carcinogen: IARC-3, TLV-A4

International Exposure Limits Currently, the following international exposure limits are in place for the Hydrochloric Acid component. This may not be a complete list and exposure limits change and should be checked for currency.

HYDROCHLORIC ACID:

Australia: CL = 5 ppm (7.5 mg/m³), JUL 2008

Austria: MAK-TMW = 5 ppm (8 mg/m³); KZW = 10 ppm (15 mg/m³), 2007

Belgium: TWA = 5 ppm (8 mg/m³), STEL = 10 ppm (15 mg/m³), MAR 2002
Denmark: CL = 5 ppm (7 mg/m³), MAY 2011
EC: TWA = 8 mg/m³ (5 ppm); STEL = 15 mg/m³ (10 ppm), JUN 2000
Finland: STEL = 5 ppm (7.6 mg/m³), SEP 2009
France: VLE = 5 ppm (7.6 mg/m³), FEB 2006
Germany: MAK = 2 ppm (3 mg/m³), 2011
Hungary: TWA = 8 mg/m³, STEL = 16 mg/m³, SEP 2000
Iceland: STEL = 5 ppm (8 mg/m³), NOV 2011
Japan: CL = 5 ppm (7.5 mg/m³), MAY 2012
Korea: CL = 5 ppm (7.5 mg/m³), 2006
Mexico: PEAK = 5 ppm (7 mg/m³), 2004
The Netherlands: MAC-TGG = 8 mg/m³, 2003
New Zealand: CL = 5 ppm (7.5 mg/m³), JAN 2002
Norway: TWA = 5 ppm (7 mg/m³), JAN 1999
Peru: STEL = 2 ppm (3 mg/m³), JUL 2005
The Philippines: TWA = 5 ppm (7 mg/m³), JAN 1993
Poland: MAC(TWA) = 5 mg/m³, CEILING = 7 mg/m³, JAN 1999
Russia: STEL = 5 mg/m³, JUN 2003
Sweden: CL = 5 ppm (8 mg/m³), JUN 2005
Switzerland: MAK-W = 2 ppm (3 mg/m³), KZG-W = 4 ppm (6 mg/m³), JAN 2011
Thailand: TWA = 5 ppm (7 mg/m³), JAN 1993
Turkey: TWA = 5 ppm (7 mg/m³), JAN 1993
United Kingdom: TWA = 1 ppm (2 mg/m³); STEL = 5 ppm (8 mg/m³) (gas, mist), OCT 2007
In Argentina, Bulgaria, Colombia, Jordan, Singapore, Vietnam check ACGIH TLV

Engineering measures

This product should be used areas with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits provided in this section, if applicable. Use a non-sparking, grounded, explosion-proof ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside, taking necessary precautions for environmental protection. An eyewash and safety shower should be readily accessible.

Exposure controls

Personal Protective Equipment

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR 1910.132), equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02, Z94.3-M1982, Industrial Eye and Face Protectors and CSA Standard Z195-02, Protective Footwear), or standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand protection, and CR 13464:1999 for face/eye protection). Please reference applicable regulations and standards for relevant details.

Respiratory protection

Maintain airborne contaminant concentrations below limits listed above, if applicable. In instances where inhalable aerosols may be generated, and respiratory protection is necessary, use only respiratory protection authorized under appropriate regulations. In the U.S., oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following are NIOSH respiratory protection equipment guidelines for the gaseous form of Hydrochloric Acid and are provided for additional information on the selection of respiratory protection equipment.

HYDROGEN CHLORIDE CONCENTRATION

Up to 50 ppm:

Any Chemical Cartridge Respirator with cartridge(s), or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted canister, or any Powered, Air-Purifying Respirator (PAPR) with cartridge(s), or any Supplied-Air Respirator (SAR), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions:

Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape:

Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister, or any appropriate escape-type, SCBA.

Hand protection

Use butyl rubber, Teflon, Viton, Saranex, or Responder gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. If necessary, refer to applicable regulations.

Eye protection

Splash goggles or safety glasses with a faceshield. If necessary, refer to appropriate country regulations and standards for further information.

Skin and Body Protection

Use body protection appropriate for task. An apron or other impermeable body protection is suggested. Full-body chemical protective clothing is recommended for emergency response procedures. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection. Refer to appropriate country regulations and standards for further information.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls

Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Information on basic physical and chemical properties

Appearance	liquid	
Color	clear colorless to pale yellow	
Odor	Strong, pungent	
Odor Threshold	0.13-10.1 ppm (detection)	
pH	0.01	
Melting point / melting range	°C -74	°F -101.2
Boiling point / boiling range	°C 81.5-110	°F 178.7-230
Flash point	°C Mixture has not been tested	°F Mixture has not been tested
Autoignition Temperature	°C Mixture has not been tested	°F Mixture has not been tested
Decomposition temperature	°C > 1500	°F > 2732
Evaporation rate	> 1.00 (N-butyl acetate)	
Flammability (solid, gas)	No data available	
Upper explosion limit	Mixture has not been tested	
Lower explosion limit	Mixture has not been tested	
Vapor Pressure	5.7 mm Hg @ 0°C	
Vapor density (air= 1)	1.26	
Relative density	Mixture has not been tested	
Specific gravity	1.1-1.2	
Solubility	Soluble in all proportions in water	
Partition coefficient: n-octanol/water	No data available	
Viscosity	No data available	
Explosive properties	Mixture has not been tested	
Oxidizing properties	No oxidizing properties	

Other information

HOW TO DETECT THIS SUBSTANCE (identification properties): Litmus paper will turn red in contact with this product and may assist in identification in event of accidental release. The odor is not a reliable form of identification as the odor threshold of Hydrochloric Acid is of the same magnitude or greater than the TLV.

SECTION 10: Stability and reactivity

Reactivity	No information available.
Chemical stability	This product is stable when properly stored (see Section 7, Handling and Storage) at normal temperature. Contact with metals can produce highly flammable hydrogen gas.
Possibility of hazardous reactions	will not occur.
Conditions to avoid	Avoid extreme temperatures and contact with incompatible chemicals.
Incompatible materials	This product is incompatible with METALS (e.g. steel, copper, brass or zinc), extremely flammable hydrogen gas is released on reaction with many common metals; SODIUM (explodes on contact); BASES (e.g. sodium hydroxide, potassium hydroxide, ammonium hydroxide, amines, 2-aminoethanol or ethyleneimine: reacts violently generating heat and pressure); FORMALDEHYDE (can react to form the potent human carcinogen, bis(chloromethyl) ether); OXIDIZING AGENTS (e.g. hydrogen peroxide, chlorates or chlorites: may react generating heat and very toxic and corrosive chlorine gas); REDUCING AGENTS (e.g. metal hydrides: reaction may produce extremely flammable hydrogen gas, heat and fire); PERCHLORIC ACID (decomposes spontaneously and violently); SULFURIC ACID (dehydrates concentrated hydrochloric acid to release some 250 volumes of hydrogen chloride gas. In a closed tank, sufficient gas may be formed to cause the tank to burst violently); POTASSIUM PERMANGANATE (a sharp explosion may be produced on adding concentrated hydrochloric acid to potassium permanganate); ALDEHYDES or EPOXIDES (hydrochloric acid may catalyze violent polymerization, generating heat and pressure); FLUORINE (incandesces on contact. Aqueous solutions produce flame.); ACETYLIDES (e.g. cesium acetylide or rubidium acetylide), BORIDES (e.g. magnesium boride), CARBIDES (e.g. rubidium carbide), PHOSPHIDE (e.g. uranium phosphide) or SILICIDES (e.g. lithium silicides: react producing spontaneously flammable gases (e.g. acetylene, borane, phosphine or silane, respectively); HEXALITHIUM DISILICIDE (incandesces in concentrated acid; flammable silanes (silicon hydrides) are evolved on contact with dilute acid); OTHER (mixing 36% hydrochloric acid with acetic anhydride or chlorosulfonic acid or oleum or propiolactone or propylene oxide or vinyl acetate in a closed container caused the temperature and pressure to increase). Hydrochloric Acid (20-38%) is corrosive to most metals, including stainless steels (e.g. 300 series, 400 series, 17-4 PH and Carpenter 20 Cb-3), aluminum (e.g. types 3003, 5052 and Cast B-356), carbon steel (e.g. types 1010, 1020, 1075 and 1076), unalloyed cast iron, zinc, the nickel-base alloys, Monel, Hastelloy D and Incoloy 800, copper, copper-nickel alloy, bronze, silicon bronze, aluminum bronze, brass, naval brass, admiralty brass and titanium. Hydrochloric acid (up to 38%) attacks plastics, such as nylon and polyacetal homopolymer (Delrina); and elastomers, such as, chlorinated polyethylene (CM), styrene-butadiene (SBR) and polysulfone.
Hazardous decomposition products	Combustion: If exposed to extremely high temperatures, thermal decomposition may generate irritating fumes and highly toxic gases (e.g. hydrogen chloride, hydrogen and chlorine). Hydrolysis: None.

SECTION 11: Toxicological information

Information on toxicological effects

Revision date 29-Dec-2017
Product code HYDROCHLORICACID18

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Product name HYDROCHLORIC ACID 18% SOLUTION

SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE: The health hazard information provided below is pertinent to employees using this product in an occupational setting. The following paragraphs describe the symptoms of exposure by route of exposure.

Inhalation: Concentrated Hydrochloric Acid solutions are very volatile and can readily release high concentrations of hydrogen chloride gas, which is very toxic and corrosive and poses a serious inhalation hazard. Even low concentrations are irritating and can cause coughing, pain, sore throat, inflammation and swelling in the upper respiratory tract. A severe exposure can cause lung injury; effects may be delayed. A single, high-level exposure may cause long-term airways hypersensitivity (RADS). Severe inhalation exposure can lead to chemical pneumonitis, pulmonary edema, and death. Chronic inhalation exposure may result in dental erosion and perforation of the nasal septum.

Contact with Skin or Eyes: Contact with the eyes will cause severe irritation, pain, reddening, watering, and possibly, blindness. Depending on the duration of skin contact, skin exposure may cause reddening, discomfort, severe irritation, and chemical burns. Chemical burns result in blistering of the skin and possible scarring. Repeated skin exposure to low concentrations can result in dermatitis (inflammation and reddening of the skin).

Skin Absorption: Skin absorption is not a significant route of exposure for this product.

Ingestion: Ingestion is not anticipated to be a likely route of occupational exposure to this product. If ingestion does occur, severe irritation and burns of the mouth, throat, esophagus, and other tissues of the digestive system will occur immediately upon contact. Symptoms of such exposure can include nausea, vomiting, diarrhea. Ingestion of large volumes of this product may be fatal.

Injection: Though not anticipated to be a significant route of exposure for this product, injection (via punctures or lacerations by contaminated objects) may cause redness at the site of injection.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Exposure to this product may cause the following health effects:

Acute: This product is corrosive and may cause severe irritation or burns by all routes of exposure. Eye contact may cause tissue damage or blindness. Ingestion may be harmful or fatal.

Chronic: Chronic inhalation of vapors, mists or spray from this product may cause reduction in lung capacity, bronchitis and erosion of the teeth. Repeated, low concentration skin contact of this product may cause dermatitis.

TARGET ORGANS: Acute: Eyes, respiratory system, skin. Chronic: Respiratory system, skin.

TOXICITY DATA: Currently, the following toxicity data are available for Hydrochloric Acid.

Standard Draize Test (Skin-Human) 4%/24 hours: Mild

LCLo (Inhalation-Human) 1300 ppm/30 minutes

LCLo (Inhalation-Human) 3000 ppm/5 minutes

LCLo (Inhalation-Human) 75 mg/m³

TCLo (Inhalation-Human) 50 mg/m³: Lungs, Thorax, or Respiration: cough, respiratory depression

LDLo (Oral-Man) 2857 µg/kg: Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: respiratory depression; Gastrointestinal: changes in structure or function of esophagus

LDLo (Oral-Woman) 420 µL/kg: Behavioral: excitement; Cardiac: pulse rate; Kidney/Ureter/Bladder: hematuria

LDLo (Unreported-Man) 81 mg/kg

TDLo (Subcutaneous-Human) 0.043 mL/kg: Vascular: acute arterial occlusion; Musculoskeletal: other changes Rinsed with Water (Eye-Rabbit) 5 mg/30 seconds: Mild

LC50 (Inhalation-Rat) 3124 ppm/1 hour: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): iritis

LC50 (Inhalation-Rat) 45,000 mg/m³/5 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema

LC50 (Inhalation-Rat) 8300 mg/m³/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema

LC50 (Inhalation-Rat) 7004 mg/m³/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema

LC50 (Inhalation-Rat) 60,938 mg/m³/5 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 LC50 (Inhalation-Rat) 3700 ppm/30 minutes
 LC50 (Inhalation-Mouse) 1108 ppm/1 hour: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Lungs, Thorax, or Respiration: respiratory stimulation Skin and Appendages: dermatitis, other (after systemic exposure)
 LC50 (Inhalation-Mouse) 8300 mg/m³/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 LC50 (Inhalation-Mouse) 3940 mg/m³/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 LC50 (Inhalation-Mouse) 2,487 mg/m³/5 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 LC50 (Inhalation-Mouse) 2644 ppm/30 minutes
 LC50 (Inhalation-Mammal-Species Unspecified) 0.1 gm/m³
 LD50 (Oral-Rabbit) 900 mg/kg
 LD50 (Intraperitoneal-Rat) 40,142 µg/kg
 LD (Intratracheal-Hamster) 146 mg/kg: Lungs, Thorax, or Respiration: structural or functional change in trachea or bronchi; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation.
 LCLo (Inhalation-Rabbit) 4413 ppm/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema, other changes; Liver: fatty liver degeneration
 LCLo (Inhalation-Rabbit) 6400 mg/m³/90 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 LCLo (Inhalation-Rabbit) 5066 mg/m³/90 minutes
 LCLo (Inhalation-Guinea Pig) 4413 ppm/30 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema, other changes; Liver: other changes
 LCLo (Inhalation-Guinea Pig) 5066 mg/m³/90 minutes
 LCLo (Inhalation-Guinea Pig) 6400 mg/m³/90 minutes: Lungs, Thorax, or Respiration: acute pulmonary edema
 TCLo (Inhalation-Rat) 685 µg/m³/24 hours/84 days-continuous: Behavioral: muscle contraction or spasticity; Kidney/Ureter/Bladder: other changes in urine composition; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: true cholinesterase
 TCLo (Inhalation-Rat) 450 mg/m³/1 hour: female 1 day(s) pre-mating: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: homeostasis
 TCLo (Inhalation-Rabbit) 149 mg/m³/6 hours/5 days-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Sense Organs and Special Senses (Eye): conjunctive irritation; Lungs, Thorax, or Respiration: respiratory depression
 TCLo (Inhalation-Rabbit) 150 mg/m³/6 hours/50 days-intermittent: Behavioral: irritability; Blood: other changes
 TCLo (Inhalation-Cat) 150 mg/m³/6 hours/50 days-intermittent: Behavioral: irritability; Blood: other changes
 TCLo (Inhalation-Mammal-species unspecified) 450 mg/m³/6 hours: Sense Organs and Special Senses (Eye): corneal damage; Lungs, Thorax, or Respiration: other changes
 LDLo (Intratracheal-Dog) 7.3 mg/kg: Cardiac: pulse rate increase, without fall in BP; Lungs, Thorax, or Respiration: dyspnea
 DNA Repair (Bacteria-Escherichia coli) 25 µg/well
 Sex Chromosome Loss and Non-Disjunction (Inhalation-Drosophila melanogaster) 100 ppm/24 hours
 Sex Chromosome Loss and Non-Disjunction (Oral-Drosophila melanogaster) 100 ppm
 Cytogenetic Analysis (Parenteral-grasshopper) 20 mg
 Cytogenetic Analysis (Hamster-Lung) 30 mmol/L
 Cytogenetic Analysis (Hamster-Ovary) 8 mmol/L.

Principal Routes of Exposure

Irritation	This product may cause severe irritation or burns by all routes of exposure.
Corrosivity	Conclusive but not sufficient for classification
Sensitization	The components of this product are not known to cause human skin or respiratory sensitization.
STOT - Single Exposure	Conclusive but not sufficient for classification
STOT - Repeated Exposure	Conclusive but not sufficient for classification
Carcinogenicity	The components of this product are listed by agencies tracking the carcinogenic

potential of chemical compounds, as follows:

HYDROCHLORIC ACID:

ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen);

IARC-3 (Unclassifiable as to Carcinogenicity in Humans)

Mutagenicity

The components of this product are not reported to cause human mutagenic effects. The available evidence does not indicate that Hydrochloric Acid is a mutagen. There are no studies available using live animals. Positive and negative results were obtained in cultured mammalian cells and bacteria. Positive results in cultured mammalian cells are believed to be caused by low pH. Positive results (chromosomal aberrations) were obtained in cultured mammalian cells, in the presence and absence of metabolic activation. Positive results (gene mutations) were also obtained in cultured mammalian cells, in the presence of metabolic activation. These effects are believed to be caused by the low pH. Negative results (gene mutation, chromosome aberrations, sister chromatid exchange) were obtained in cultured mammalian cells, with and without metabolic activation. Negative results (gene mutation, DNA damage) were obtained in bacteria, with and without metabolic activation. Positive results (DNA damage) were obtained in bacteria.

Reproductive toxicity

Embryotoxicity/Teratogenicity: The components of this product are not reported to cause human embryotoxic or teratogenic effects. The limited evidence available does not indicate that Hydrochloric Acid is a developmental toxin. In a limited study, hydrogen chloride gas caused developmental toxicity in rats exposed by inhalation to concentrations that caused severe maternal toxicity. Rats were exposed by inhalation to 300 ppm hydrogen chloride gas (cited as 450 mg/m³) for 1 hour either 12 days before mating or on day 9 of pregnancy. The exposure caused death of one third of the mothers with severe effects on lung function and impairment of kidney and liver function. There was a significant increase in mortality in the offspring of mothers exposed during pregnancy and a significant decrease in fetal weight for offspring of mothers exposed before mating. The offspring also had decreased kidney and liver function and increased sensitivity of the lungs to hydrogen chloride. This study is limited by the use of only exposure concentration and by the non-standard exposure protocol.

Reproductive Toxicity: The components of this product are not reported to cause human reproductive effects.

Aspiration hazard

Conclusive but not sufficient for classification

SYNERGISTIC MATERIALS

No synergistic materials are known.

ACGIH BIOLOGICAL EXPOSURE INDICES (BEIs)

Currently, ACGIH Biological Exposure Indices (BEIs) have not been determined for the components of this product.

SECTION 12: Ecological information

Toxicity

This product has not been tested for aquatic or animal toxicity. All release to terrestrial, atmospheric, and aquatic environments should be avoided. The following aquatic toxicity data are available for the Hydrochloric Acid component:

TLm *Gambusia affinis* (mosquito fish) 96 hours = 282 ppm (fresh water)

LC100 (Trout) 24 hours = 10 mg/L/Conditions of bioassay not specified

LC50 (Shrimp) 48 hours = 100 to 330 ppm (salt water)

LC50 (Starfish) 48 hours = 100 to 330 mg/L

LC50 (Cockle) 48 hours = 330 to 1,000 mg/L
LC50 Carassius auratus (goldfish) 178 mg/L (1 to 2 hr survival time)
LC50 (Shore crab) 48 hours = 240 mg/L
Lethal (Lepomis macrochirus bluegill sunfish) 48 hours = 3.6 mg/L
LC50 (Lepomis macrochirus bluegill sunfish) 96 hours = at pH between 3.5 and 3.0 /hydrogen ion concentration.

Mobility When anhydrous hydrogen chloride is spilled onto the soil, extensive evaporation will occur. Therefore, with regard to infiltration into the soil, only Hydrochloric Acid is considered. However, when Hydrochloric Acid is spilled onto soil, it will begin to infiltrate. The presence of water in the soil will influence the rate of chemical movement in the soil. During transport through the soil, Hydrochloric Acid will dissolve some of the soil material, in particular those of a carbonate base. The acid will be neutralized to some degree. However, significant amounts of acid are expected to remain for transport.

Persistence and degradability Hydrogen chloride in water dissociates almost completely, with the hydrogen ion captured by the water molecules to form the hydronium ion.

Bioaccumulative potential Material does not bioaccumulate.

Results of PBT and vPvB assessment
No information available.

Other adverse effects Components of this product are not listed or expected to have having ozone depletion potential.

SECTION 13: Disposal considerations

Waste treatment methods

It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or lined metal waste pails or drums. Hydrochloric Acid solutions are corrosive to many metals including steel, copper and zinc. Metal containers should not be made of stainless steels (e.g. 300 series, 400 series, 17-4 PH and Carpenter 20 Cb-3), aluminum (e.g. types 3003, 5052 and Cast B-356), carbon steel (e.g. types 1010, 1020, 1075 and 1076), unalloyed cast iron, zinc, the nickel-base alloys, Monel, Hastelloy D and Incoloy 800, copper, copper-nickel alloy, bronze, silicon bronze, aluminum bronze, brass, naval brass, admiralty brass and titanium. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials. Dispose of in accordance with applicable Federal, State, and local procedures and standards.

EPA Waste number

Wastes of this product should be tested to see if they meet the criteria of Waste Characteristic D002 (Corrosivity)

SECTION 14: Transport information

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA)

This product is classified as dangerous goods, per the International Air Transport Association.

UN number	UN 1789
UN proper shipping name	Hydrochloric acid solution
Transport hazard class(es)	8

Packing group	II
Excepted Quantities	E2
Passenger and Cargo Aircraft Packing Instruction	851
Passenger and Cargo Aircraft Maximum Net Quantity per Pkg.	1L
Passenger and Cargo Aircraft Limited Quantity Packing Instruction	Y840
Passenger and Cargo Aircraft Limited Quantity Maximum Net Quantity per Pkg	0.5L
Cargo Aircraft Only Packing Instruction	855
Cargo Aircraft Only Maximum Net Quantity per Pkg.	30L
Special Provisions	A3, A803
ERG Code	8L

U.S. DEPARTMENT OF TRANSPORTATION REGULATIONS

This product is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

UN number	UN 1789
UN proper shipping name	Hydrochloric acid solution
Transport hazard class(es)	8
Packing group	II
DOT Label(s) Required	Class 8 (Corrosive)
Emergency Response Guidebook Number, 2012	157
Marine Pollutant	No component of this product meets the criteria of the DOT as Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

Quantity Exception

Shipments of this product may be shipped under small quantity and limited quantity exceptions as indicated under 49 CFR §173.4 and 49 CFR §173.154, if all requirements are met.

Small Quantity Exception (49 CFR 173.4): Small quantities of Class 8 material are not subjected to other requirements of the Hazardous Materials Regulations (Subchapter C) when the maximum quantity per inner receptacle is limited to 30 mL (liquids). Refer to 49 CFR 173.4 for specific information in packaging small quantity materials.

Limited Quantity Exceptions [49 CFR 173.154(b)(2)]: Limited quantities for Class 8, Packing Group II materials have inner packagings not over 1.0 L (liquids) net capacity each, packed in strong outer packaging.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS

This product is classified as Dangerous Goods, per regulations of Transport Canada.

UN number	UN 1789
UN proper shipping name	Hydrochloric acid solution
Transport hazard class(es)	8
Packing group	II
Hazard Label(s) Required	Class 8 (Corrosive)
Special Provisions	None
Explosive Limit and Limited Quantity Index	1
ERAP Index	3000
Passenger Carrying Ship Index	None
Passenger Carrying Road or Rail Vehicle Index	1
Marine Pollutant	This product does not meet the criteria to be a Marine Pollutant.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO)

This product is classified as dangerous goods, per the International Maritime Organization.

UN number	UN 1789
UN proper shipping name	Hydrochloric acid solution
Transport hazard class(es)	8

Packing group	II
Hazard Label(s) Required	Class 8 (Corrosive)
Special Provisions	None
Excepted Quantities	E2
Limited Quantities	1L
Packing	Instructions: P001; Provisions: None
IBCs	Instructions: IBC02; Provisions: B20
Tanks	Instructions: T8; Provisions: TP2
EmS	F-A, S-B
Stowage and Segregation	Category C
Marine Pollutant	This product does not meet the criteria to be a Marine Pollutant.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR)

This product is classified by the Economic Commission for Europe to be dangerous goods.

UN number	UN 1789
UN proper shipping name	Hydrochloric acid solution
Transport hazard class(es)	8
Packing group	II
Classification Code	C1
Label	8
Special Provisions	520
Limited Quantities	1L
Excepted Quantities	E2
Packing Instructions	P001, IBC02
Packing Special Provisions	None
Mixed Packing Provisions	MP15
Portable Tank & Bulk Container Packing Instructions	T8
Portable Tank & Bulk Container Special Provisions	TP2
Hazard Identification No.	80

Environmental hazards

This material does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN); components are not specifically listed in Annex III under MARPOL 73/78

Special precautions for user

Not Applicable

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

See the information under the individual jurisdiction listings for IBC information.

SECTION 15: Regulatory information

United States regulations

U.S. SARA Reporting Requirements: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows

<u>Chemical Name</u>	<u>CAS-No</u>	<u>Weight %</u>	<u>SARA 302(40 CFR 355, Appendix A)</u>	<u>SARA 304(40 CFR Table 302.4)</u>	<u>SARA 313(40 CFR 372.65)</u>
hydrochloric acid	7647-01-0	18	No	No	Yes

U.S. SARA Threshold Planning Quantity (TPQ): There are no specific Threshold Planning Quantities for components

of this product. The default Federal SDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA Reportable Quantity (RQ): Hydrochloric Acid = 5000 lb (2270 kg)

U.S. TSCA Inventory Status: The components of this product are listed on the TSCA Inventory.

Other U.S. Federal Regulations: Components of this product have requirements under additional U.S. regulations, as follows:

THE CLEAN AIR ACT: Hydrochloric Acid is listed as a Hazardous Air Pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants.

CLEAN WATER ACT: Hydrochloric Acid is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance.

CERCLA REPORTABLE QUANTITIES: Releases of CERCLA hazardous substances are subject to the release reporting requirement of CERCLA section 103, codified at 40 CFR part 302, in addition to the requirements of 40 CFR part 355. Hydrogen chloride is an extremely hazardous substance (EHS) subject to reporting requirements when stored in amounts in excess of its threshold planning quantity (TPQ) of 500 lb (270 kg). Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 10 lb or 4.54 kg. The toll free number of the NRC is (800) 424-8802; In the Washington D.C. metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b)

California Proposition 65

This product does not contain any Proposition 65 chemicals.

Canadian regulations

Canadian DSL/NDSL Status: The components of this product are listed on the DSL inventory.

Canadian Environmental Protection Agency (CEPA) Priorities Substances List: The Hydrochloric Acid component has requirements under CEPA. Substance with Greatest Potential For Human Exposure Substance on Environment Canada/Health Canada Pilot Project List (CEPA 1999, Section 73). Meets categorization criteria: *may present, to individuals in Canada, the greatest potential for exposure; or *are persistent or bio-accumulative in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

WHMIS Hazard Class

E - Corrosive material



SECTION 16: Other information

Reason for revision	SDS sections updated.
Revision number	1
Revision date	29-Dec-2017

Product Use: Various.

References

Revision date 29-Dec-2017
Product code HYDROCHLORICACID18

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Product name HYDROCHLORIC ACID 18% SOLUTION

- ECHA: <http://echa.europa.eu/>
- TOXNET: <http://toxnet.nlm.nih.gov/>
- eChemPortal: <http://www.echemportal.org/>
- LOLI database: <https://www.chemadvisor.com/loli-database>

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End of Safety Data Sheet