Allied Signal

MURIATIC ACID

PRODUCT SAFETY DATA SHEET

SW HCl

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C.A.S. NO. ☐ ALLIED PRODUCT CODE #
MURIATIC ACID	7647-01-0

CHEMICAL NAME AND/OR SYNONYM

Hydrochloric Acid Synonym: Muriatic Acid

FORMULA	MOLECULAR WEIGHT
HCl (28-35 wt. % in water)	36.46 (for anhydrous HCl)

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

Allied-Signal Inc.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07962-1139

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	August, 1987	August, 1990

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER (201) 455-2000

EYES: Immediately flush with water, lifting eyelids occasionally to facilitate irrigation; continue for 20 to 30 minutes. Do not use chemical antidotes. Get medical help. Speed is essential.

SKIN: Immediately flush affected are with water, removing any contaminated clothing. Continue washing for at least 15 minutes (deluge showering is essential if exposure to liquid acid is extensive). Get medical evaluation. Speed is essential. Wash clothing before reuse.

INGESTION: If conscious and free of convulsions, give large amounts of water immediately. Do not induce vomiting. Give a nongassing neutralizer, such as milk, milk of magnesia or calcium hydroxide. Do not give carbonates, bicarbonates, chalk. Get prompt medical attention.

INHALATION: Promptly remove to fresh air (rescuers may in some situations be advised to wear personal protective equipment -- see Section E). If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen, provided a qualified operator is available. Get prompt medical attention.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Inhalation of vapor or mist can cause irritation or corrosive burns to the upper respiratory tract. Intense lacrimation, coughing, throat irritation, sneezing and labored breathing may occur. Following high exposures, lung irritation and pulmonary edema can also occur, sometimes delayed. Concentrations of 0.13 to 0.2% in air can be lethal to humans in a few minutes [Ref. (d)]. LC_{50} (ihl-rat): 3124 ppm/1 hour. LCLo (ihl-human): 1300 ppm/30 minutes [Ref. (a)].

INGESTION

Although unlikely to occur, ingestion can cause irritation and burns to the gastro-intestinal tract. May perforate stomach or esophagus in extreme cases. Asphyxia may occur from edema of the larynx. Dehydration is a primary hazard with concentrated material. For more dilute solutions, the animal LD_{50} (rabbit) of 900 mg/kg may be pertinent (moderately toxic) -- Ref. (a).

SKIN

Severity of injury will depend on quantity, concentration and duration of contact. Liquid contact: may cause severe burns, pain and brownish or yellow stains. Solution contact: irritation, dermatitis or burns. Vapor contact: irritation or burns. Mist contact: irritation.

EYES

Severity of injury will depend on quantity, concentration and duration of contact. Both liquid and vapor contact can cause irritation, corneal burns, and conjunctivitis. Permanent damage with loss of sight can occur -- Reference (b).

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)	BIOLOGICAL
The OSHA/TWA and ACGIH/TLV are the same: 5 ppm Ceiling (as Hydrogen Chloride).	None established.

UNUSUAL CHRONIC TOXICITY

Excessive exposure, repeated or prolonged, may cause erosion of the teeth. Gastritis and chronic bronchitis among workers exposed to hydrochloric acid have been reported. [Reference (c)].

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
N.A. °C (Not Flammable) ☐ OPEN CUP ☐ CLOSED CUP	Not applicable °C	LOWER - Not applicable UPPER - Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

Acid reacts with steel and most other metals to generate hydrogen gas, which is a serious fire and explosive hazard. See, also, Section G: "Hazardous Decomposition Products".

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

If involved in a fire, use water; neutralize any spilled material with chemically basic substances, such as soda ash, lime or limestone (see neutralization technique under "Spill or Leak", below).

FIRE EXTINGUISHING AGENTS TO AVOID

No standard agent.

SPECIAL FIRE FIGHTING PRECAUTIONS

Firefighters should wear self-contained, NIOSH-approved, breathing apparatus with full facepiece and full protective clothing. Use water spray to cool fire-exposed containers. Take precautions so as not to splash this material onto other personnel.

VENTILATION

Provide corrosion-resistant ventilation sufficient to reduce acid mist and vapor concentrations to or below current TLV levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems or local exhaust. Reference (b) provides more details on applications.

NORMAL HANDLING

Do not get in eyes, on skin or clothing. Avoid breathing mist or vapor. Use only with adequate ventilation. Keep away from metals and incompatible chemicals. Wash thoroughly after handling.

STORAGE

Store in a dry, well-ventilated area away from heat, out of sun and away from oxidizing substances (nitric acid, etc.) or other incompatible materials. Diking of storage tanks is recommended. Elevated temperatures will increase vapor pressure of product; use care when opening container.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT - SECTION E)

Fully protected personnel should dilute small spills or leaks cautiously with plenty of water. Neutralize residue with alkali such as soda ash, lime or limestone, and provide ample ventilation to eliminate the carbon dioxide that is formed. For major spills, keep unprotected personnel away. Contain the acid by diking the spill with soil or clay. Recover the acid, if possible. Attempt to keep out of sewer. Any release to the environment of this material may be subject to federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

SIGNAL WORD - DANGER!

To prevent ignition of hydrogen gas generated by accidental contact of metals with the acid, smoking, open flames and sparks must not be permitted in storage or handling areas. Medical surveillance and employee education are recommended for those working with this acid.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

For spill or emergency, where required, use a respirator approved by NIOSH for hydrogen chloride gas and/or mist, as applicable. Some exposures may require self-contained breathing apparatus, generally with full facepiece, or supplied-air respirator, generally with a full facepiece, helmet, or hood -- also NIOSH-approved. For details and other choices, see Ref. (b).

EYES AND FACE

As a minimum, wear hard hat, chemical safety goggles, and full facepiece (if not obstructed by the respirator in use, if any). Do not wear contact lenses. In case of exposure to mists, chemical safety goggles are necessary; add a face shield if pouring liquid.

HANDS, ARMS, AND BODY

Prevent any contact of liquid with body. As a minimum, wear acid-resistant apron, protective clothing, boots, and gauntlet gloves for routine product-handling use. For increased protection, include acid-resistant trousers and jacket. Diluted solutions also require such protection [see Ref. (b) for details]. Wash contaminated clothing before reuse.

OTHER CLOTHING AND EQUIPMENT

Provide eyewash stations and quick-drench shower facilities convenient to areas of handling, use or storage. Keep neutralization supplies and equipment for handling spills at hand.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless to light yellow liquid; pungent odor.

		SPECIFIC GRAVITY (H_2O = 1)	VAPOR DENSITY (AIR = 1)
BOILING POINT *	(20°Bé) 83 °C (22°Bé) 61	20°Bé = 1.16 22°Bé = 1.18	1.27
MELTING POINT *	(20°Bé) -53 °C (22°Bé) -66		

SOLUBILITY IN WATER (% by Weight)	pH	VAPOR PRESSURE (mm Hg at 20°C: ☒ (PSIG) ☐
complete	1% solution: pH = 0.8	20°Bé = 25 22°Bé = 84

EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒	% VOLATILES BY VOLUME (At 20°C)	* (20 °Bé) -- 31.5% HCl (22 °Bé) -- 35.2% HCl
(Time to evaporate) > 1 (est.)	28 - 35 (HCl only)	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Elevated temperatures (increase vapor pressure of product; may rupture container).

INCOMPATIBILITY (MATERIALS TO AVOID)

Most metals (see Section C, p. 2). Alkalis, metallic oxides, amines, esters, and certain other organics: beta-propiolactone, propylene oxide - Ref. (e) -- cause exothermic reactions, possibly violent. Carbonates, cyanides, sulfides -- yield toxic gases. Water-reactive materials, such as sulfuric acid, oleum and acetic anhydride -- cause exothermic reaction.

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen chloride vapors (released normally at ambient conditions) are released in increasing amounts at higher temperatures. Will release hydrogen when in contact with some metals.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	Not relevant.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
Not applicable.		

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Degradability: Not applicable -- inorganic.
Aquatic Toxicity: 282 ppm/96 hr/mosquito fish/TLm/fresh water.
100-330 ppm/48 hr/shrimp/LC_{50} /salt water. (Reference [f])

OCTANOL/WATER PARTITION COEFFICIENT: Unknown

EPA HAZARDOUS SUBSTANCES (CLEAN WATER ACT SEC. 311)	YES	NO	IF SO REPORTABLE QUANTITY:			40 CFR
	☒	☐	17,800 #	(28 wt. % acid)		116-117
			14,300	(35 wt. % acid)		

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Waste Muriatic Acid (28-35%) should be cautiously diluted with water and neutralized with an alkali. Neutralized waste must be disposed of in accordance with applicable disposal regulations. Users should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material. Waste may have to be disposed of by an approved contractor.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED	HAZARDOUS WASTE NUMBER: (IF APPLICABLE)	40 CFR
EPA "hazardous waste" (corrosive), if discarded.	D002	261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

TWA: OSHA regulations, 29 CFR 1910.1000 (1982), "Z List".
TLV: ACGIH 1989-90 List, "Threshold Limit Values and Biological Exposure Indices ".

REGULATORY STANDARDS	D.O.T. CLASSIFICATION:	49 CFR 173
Dot classification: Hazardous Materials Table, 49 CFR 172.101. FDA regulations apply to the use of any product sold as food grade (21 CFR).	Corrosive Material I.D. No.: UN 1789	

GENERAL

(a) NIOSH Registry (RTECS), 1981-82, Accession No. MW4025000 (Hydrochloric Acid).
(b) NIOSH/OSHA: "Occupational Health Guideline for Hydrogen Chloride", 1978.
(c) ACGIH: "Documentation of Threshold Limit Values", 5th ed., 1986.
(d) Tech. Guide #7, "Handbook of Hazardous Materials", Am. Mutual Insurance Alliance, 1974.
(e) NFPA Manual 491M, "Manual of Hazardous Chemical Reactions", 8th ed., 1984.
(f) U.S. Coast Guard CHRIS Manual: entry: Hydrochloric Acid.

K. ADDITIONAL INFORMATION

Information on hazards, precautionary measures, first aid, etc., is abbreviated. For more detailed information, refer to references listed above in Section J.

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