

GPS SAFETY SUMMARY

Hydrochloric Acid

1. General Statement

Hydrochloric acid is an important and widely used chemical. The largest end uses for hydrochloric acid are steel pickling, oil well acidizing, food manufacturing, producing calcium chloride, and ore processing. Hydrochloric acid is a corrosive liquid, and it must be stored and handled with this hazard in mind.

2. Chemical Identity

Synonyms : Hydrochloric acid
Chemical Formula : HCl
Molecular Weight : 36.45
Description : Hydrochloric acid is a corrosive liquid
CAS number(s) : 7647-01-0
ES Number : 231-595-7

3. Use and applications

Hydrochloric acid is an important and widely used chemical. The largest end uses for hydrochloric acid are steel pickling, oil well acidizing, food manufacturing, producing calcium chloride, and ore processing.

Hydrochloric acid is an acid used in pharmaceutical industry, fine chemistry and large scale substance manufacturing (including petroleum products). It is also used in the formulation of preparations and/or re-packaging (excluding alloys), and for electronics applications.

4. Physical / Chemical properties

Corrosively

Hydrochloric acid is very corrosive to the skin and mucous membranes and can cause severe burns to any part of the body. The corneas of the eyes are especially sensitive to hydrochloric acid and exposure to it or its vapors immediately causes severe irritation. If the eyes are not quickly and thoroughly irrigated with water, partial or total visual impairment or blindness can occur.

Reactivity

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Hydrochloric acid is extremely corrosive to metals, including the following: carbon steel, stainless steel, nickel, bronze, brass, copper, and aluminum. These are commonly used industrial materials. Great care should be taken to avoid contact of these materials with hydrochloric acid.

Hydrochloric acid is shipped in rubber-lined tank cars or tank trucks. It is most commonly stored either in rubber-lined steel storage tanks or in fiberglass-reinforced plastic storage tanks. Choosing the correct material of construction for piping, hoses, pumps, valves and other equipment is also very important to extend the life of the equipment, prevent corrosion, and prevent leaks.

Property	Value
Physical state	Gas at 20°C and 1013 hPa
Form	Liquefied gas (under pressure) Solution in water
Colour	Colourless (gas, diluted solutions) Yellow to green (concentrated solutions)
Odour	Irritating (gas, solution)
Molecular weight	36.5 g/mol
Density	1.49 kg/m ³ at 25°C (gas, calculated) 1.17 kg/L (solution at 35%)

5. Health Effects

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Toxic by inhalation (gas). Risk of pulmonary edema (gas, solution). Risk of burns to the mouth, esophagus and stomach.
Irritation / corrosion Skin / eye / respiratory tract	Severely irritating to respiratory tract (gas, solution). Corrosive to skin and eye (gas, solution).
Sensitisation	Inhalation: no data. Dermal: not sensitizing (solution).
Toxicity after repeated exposure Oral / inhalation / dermal	Studies of prolonged inhalation in animals mainly showed local effects related to corrosion/irritation (gas). Dermal and oral: not relevant for a gas.
Genotoxicity / Mutagenicity	Not expected to cause genetic effects based on available <i>in vitro</i> test data where the pH was properly controlled.
Carcinogenicity	No carcinogenic effects were noted in rats exposed by inhalation for their lifetime (gas).
Reproductive / Developmental Toxicity	Not expected to cause reproductive/developmental effects.

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Hydrochloric acid solutions are acidic solutions, meaning they have low pH. This property means hydrochloric acid is a severe eye, skin, and respiratory tract irritant, and it can burn any tissue with which it comes in contact.

- Eye splashes are especially serious hazards. Contact with the eyes can cause severe irritation, pain, and corneal burns possibly leading to blindness.
- Direct contact with the skin may cause severe burns if the material is not quickly rinsed away with large amounts of water.

6. Environmental Effects

Hydrochloric acid is moderately toxic to aquatic organisms. It dissociates in water and can lower the pH of systems that are not well buffered. Since it contains no degradable functional groups, it exerts no biological oxygen demand.

7. Exposure

Workplace exposure – Hydrochloric Acid is industrially manufactured and used mainly in closed systems in a continuous process, minimizing the occupational exposure potential. Workers may be exposed during cleaning, maintenance, transfer (notably for formulation), sampling and analysis.

Workers who might accidentally come into contact with the gas or the solutions should follow the safety measures recommended in the relevant Extended Safety Data Sheet.

Environment -

Hydrochloric Acid is industrially manufactured and used mainly in closed systems in a continuous process, minimizing release to the environment. Procedures, controls and risk management measures are in place, which limit the environmental exposure .

If a spill occurs, emergency personnel should wear protective equipment to minimize exposures.

Consumers:

Consumers may use Hydrochloric acid solutions (maximum concentration: 20%) for private households. Exposure is limited by the warning effect of the well-known local corrosive/irritant properties: gloves are worn and inhalation is limited.

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8. Risk Management recommendations

Hydrochloric acid is non-flammable, non-explosive, and non-toxic. It is, however, an acidic material and poses hazards to the skin and eyes. Hydrochloric acid can react with certain materials of construction. Prior to using hydrochloric acid, carefully read and comprehend the Material Safety Data Sheet. The following are some risk management measures that are effective against these hazards:

Human health measures		
Organizational	Collect the latest available Safety Data Sheet. Implement good basic standards of occupational hygiene. Ensure operatives are well informed of the hazards and trained to minimise exposures. Handle and store according to the indications of the Safety Data Sheet.	
Engineering controls	Use material of high integrity for loading and unloading (gas and concentrated solutions). Gas under pressure: avoid exposure of recipient to heat and sunlight. Provide appropriate local exhaust ventilation at points of emission. Ensure that eye- and handwash stations and safety showers are close to workstation locations.	
Protection	Eye/Face protection:	Safety goggles (with sideshields for solutions)
	Skin protection:	Anti-acid protective suit, safety boots
	Hand protection:	Neoprene gloves (gas) or PVC gloves (solutions) tested to EN374
	Respiratory protection:	Gas or solution with important or long exposure: self-contained breathing apparatus. Solutions with low and short exposure: complete mask (A2B2 filter).
Environment protective measures		
Do not release in the environment. Monitor environmental pH in case of release.		

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9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information


This substance has notably been registered and assessed under:

- EU Regulation EC 1907/2006 (REACH),
- US EPA IRIS (Integrated Risk Information System),
- OECD SIDS (Screening Information Data Set) program.


9.2 Classification and labeling

Under GHS, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according to CLP (EC) 1272/2008, implementation of the GHS in the European Union.

For the particular case of Hydrochloric Acid, classification and labeling depend on physical form (gas or solution) and concentration (for solutions) as detailed below:

Classification	
— Corrosion to metals: Category 1 — Skin corrosion: Category 1B. — Serious eye damage: Category 1. — Specific target organ toxicity - single exposure (inhalation): Category 3; May cause respiratory irritation.	
Signal word	
Danger	
Pictograms	
— GHS05: Corrosion	

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— GHS07: Exclamation mark	
Hazard statements	
— H290: May be corrosive to metals. — H314: Causes severe skin burns and eye damage. — H335: May cause respiratory irritation.	

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