

**CLIP, Chemical Laboratory Information Profile**

"Only when you know the hazards, can you take the necessary precautionary measures."

**Hydrochloric Acid (approx 36%) HCl(aq)****CAS No.: 7647-01-0**

Synonyms: concentrated hydrochloric acid, muriatic acid

**Physical Properties**

A strong and corrosive acid. A colorless, fuming liquid with a sharp, painful odor  
 Vapor pressure at 20 °C: 215 Torr (368 ppm)  
 Boiling point: 110 °C

**Exposure Limits**

OSHA STEL/C: 5 ppm  
 ACGIH STEL/C: 5 ppm

**Hazardous Characteristics**

Overall toxicity	Flammability	Destructive to skin/eye	Absorbed through skin	Sensitizer?	Self-reactive?	Incompatible with:
3	0	3	0	No	No	Bases, oxidizing agents, most metals*

0: None (or very low); 1: Slight; 2: Moderate; 3: High; 4: Severe.

**\*Reaction with:**

Bases is exothermic and can be violent; oxidizing agents produces chlorine, a severely toxic gas and oxidizing agent; most metals produces hydrogen, which is flammable and explosive. See Bretherick's *Handbook of Reactive Chemical Hazards* for details and for other incompatibilities.

Cited as known to be or reasonably anticipated to be carcinogenic in NTP-9?

No

Identified as a reproductive toxin in Frazier and Hage, *Reproductive Hazards of the Workplace*?

No

**Typical symptoms of acute exposures:**

Tissue destruction of eyes, skin, or mucous membranes with pain, severe discomfort, or stinging sensation. Difficulty in breathing if vapor or mist is inhaled; may cause lung edema but symptoms may be delayed. Acidic or sour taste if in mouth, with destruction of teeth and mouth tissues. Sore throat and/or abdominal pain if swallowed.

**Principal target organ(s) or system(s):**

Eyes, skin, respiratory system.

**Storage Requirements**

Separate from bases and oxidizing agents with other inorganic acids (except oxidizing acids such as nitric, perchloric, etc.) in a cool, dry, well-ventilated location.

**Additional Remarks**

Hydrochloric acid vapor is corrosive and denser than air. Consequently, the vapor can travel long distances and will tend to collect in lower areas, especially if partially enclosed. The vapor also forms toxic  $\text{NH}_4\text{Cl}$  when vapors from  $\text{NH}_3(\text{aq})$  are present. The National Institute for Occupational Safety and Health considers vapor concentrations greater than or equal to 50 ppm to be immediately dangerous to life and health.

**Notes****ReadMe**

This Chemical Laboratory Information Profile is *not* a Material Safety Data Sheet. It is a brief summary for teachers and their students that describes some of the hazards of this chemical as it is typically used in laboratories. On the basis of your knowledge of these hazards and before using or handling this chemical, *you need to select the precautions and first-aid procedures to be followed*. For that information as well as for other useful information, refer to Material Safety Data Sheets, container labels, and references in the scientific literature that pertain to this chemical.

**Reproductive Toxins**

Some substances that in fact are reproductive toxins are not yet recognized as such. For the best readily available and up-to-date information, refer to "DART/ETIC". See the TOXNET home page at [www.sis.nlm.nih.gov](http://www.sis.nlm.nih.gov) and click on "Toxicology search". *Note that some of the data in DART/ETIC have not been peer-reviewed*. See also Linda M. Frazier and Marvin L. Hage, *Reproductive Hazards of the Workplace*; Wiley, 1998; and T. H. Shepard, *Catalog of Teratogenic Agents*, 9th ed.; Johns Hopkins University Press, 1998.

**Abbreviations**

ACGIH TLV—American Conference of Governmental Industrial Hygienists—Threshold Limit Value. C—Ceiling. CAS—Chemical Abstracts Service.  $\text{mg}/\text{m}^3$ —milligrams per cubic meter. NA—Not applicable. NE—Not established. NI—No information. NTP-9—National Toxicology Program, Ninth Annual Report on Carcinogens. OSHA PEL—Occupational Safety and Health Administration—Permissible Exposure Limit. ppm—parts per million. STEL/C—Short-term exposure limit and ceiling.

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