



August 2019

PRODUCT STEWARDSHIP SUMMARY: HYDROCHLORIC ACID

Overview

This Product Stewardship Summary provides a general overview of hydrochloric acid (HCl). Cabot Corporation (Cabot) produces anhydrous HCl gas and up to 32% aqueous HCl. HCl is a highly reactive chemical. It is corrosive and irritating to any tissue it contacts, therefore workers involved in transport, storage and handling of HCl need to understand the hazards and handle it accordingly. The majority of HCl produced is used as an industrial chemical. Some aqueous HCl is produced as food grade acid, which is used by the food industry as food ingredients and additives.

Chemical Identity

HCl (CAS # 7647-01-0) is a strong inorganic acid that is used in many industrial processes and some food applications. The specific application often determines the required product strength. Cabot produces anhydrous HCl gas, 19% aqueous HCl and 32% aqueous HCl.

Physical and Chemical Properties

Anhydrous HCl gas is a colorless to slightly yellow, corrosive, nonflammable gas that is heavier than air and has a strong irritating odor (ATSDR, 2002). Aqueous HCl is a colorless to light yellow liquid that has a strong pungent odor. HCl is very soluble and completely dissociates into hydrogen ions (protons) and chloride ions in water. It is a strong acid and reacts with most metals producing explosive hydrogen gas (OECD, 2002).

Uses

Cabot's HCl products are formed as by-products of Cabot's fumed silica and alumina manufacturing processes. Anhydrous HCl off-gas, generated from the reaction process, is transferred to an on-site acid recovery plant, which produces high purity anhydrous HCl, and 19% and 32% aqueous HCl. The HCl products are used in various industrial processes, including metal cleaning products, electroplating, solvent for electronics industry, ore mining and refining, chemical intermediate, laboratory reagent and preservatives. In addition, food grade HCl is sold into the food industry where it is used as food ingredients and additives. As an example, HCl is used in pickled food products.

Health Effects

Depending on the concentration, HCl can produce moderate irritation to severe burns of the eyes, skin and respiratory tract. Swallowing concentrated HCl can cause severe corrosive injury to the lips, mouth, throat, esophagus and stomach. Long-term exposure to low levels can cause respiratory problems, eye and skin irritation, and discoloration of the teeth (ATSDR, 2002).

HCl is not associated with cancer in animal studies or human epidemiology studies. HCl is not expected to have reproductive or developmental toxicity (OECD, 2002). Revision 0: August 29, 2011
Although HCl is widely used as a food processing agent, its acidity is neutralized or buffered in these food products (OECD, 2002).



Environmental Effects

HCl released into the environment is distributed into the air and water. HCl does not accumulate in living organisms due to its high solubility and dissociation properties. The hazard of HCl to the environment is caused by the pH effect. For this reason the effect of HCl on organisms depends on the buffer capacity of the aquatic system (OECD, 2002); that is, the ability of the aquatic system to neutralize the acidic effects of HCl. In some aquatic systems, HCl is acutely toxic to organisms. It is not expected to biodegrade in water or soil.

Exposure Potential

The general public has low exposure to HCl in pickled and other food products because the HCl is neutralized or buffered in food applications (OECD, 2002).

HCl is often handled in enclosed systems, thereby limiting worker exposures. Limited exposure could occur during manufacture, transportation and use, or in accidental situations. Because of the known hazards of HCl, worker exposure is managed with engineering controls and personal protective equipment. HCl vapors are controlled below applicable occupational exposure limits.

Risk Management

Risk is measured as a function of both hazard and exposure. While the hazards of HCl are well known, the risk is controlled through the control of exposure. HCl exposure to workers is managed aggressively through engineering controls and personal protective equipment. Although HCl is used in food ingredients and additives, the acidity is neutralized or buffered in these applications. Other consumer products generally do not contain significant amounts of HCl. Federal, state and local authorities have developed various regulations on storage, handling, transport and disposal of HCl, which must be followed to ensure that HCl risks are managed appropriately.

Cabot Corporation Contacts

We appreciate your interest in hydrochloric acid. If you need additional information, please feel free to contact Cabot's Product Support and Toxicology Group at regulatory.inquiries@cabotcorp.com

Disclaimer

This Product Stewardship Summary is intended to provide the general public with an overview of this chemical substance. It is not intended to provide emergency response, medical or treatment information. In-depth safety and health information can be found on the current Safety Data Sheet (SDS) for the product.



References

- ATSDR. 2002. ToxFAQs™ for Hydrogen Chloride. Agency for Toxic Substances and Disease Registry. [http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=759&tid=147]
- OECD. 2002. SIDS Initial Assessment Report. Hydrogen Chloride. Organisation for Economic Co-operation and Development (OECD) Screening Information Data Set (SIDS). UNEP Publications [http://www.inchem.org/documents/sids/sids/7647010.pdf].

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