Hydrochloric acid (Acidum hydrochloricum)

HCl

Relative molecular mass. 36.46

Chemical name. Hydrochloric acid; CAS Reg. No. 7647-01-0.

Description. A clear, colourless, fuming liquid; odour, pungent.

Miscibility. Miscible with water.

Category. Acidifying agent.

Storage. Hydrochloric acid should be kept in a tightly closed container.

Additional information. The fumes and odour disappear when the acid is diluted with 2 volumes of water.

Mass density: ρ_{20} = about 1.18 g/mL.

Requirements

Hydrochloric acid contains not less than **35.0% *m/m*** and not more than the equivalent of **38.0% *m/m*** of HCl.

Identity tests

A. It is strongly acid.

B. Use 0.1 mL; it yields the reactions described under 2.1 General identification tests as characteristic of chlorides.

C. Allow a glass stick wetted with ammonia (~100 g/l) TS to come near the surface of Hydrochloric acid; white fumes are evolved.

Heavy metals. For the preparation of the test solution evaporate 4 g to dryness on a water-bath, add 2 mL of acetic acid (~60 g/l) PbTS, dilute to 40 mL and mix; determine the heavy metals content as described under 2.2.3 Limit test for heavy metals, Method A; not more than 5 µg/g.

Arsenic. Dilute 4.3 mL to 10 mL with water. Use 1 mL and proceed as described under 2.2.5 Limit test for arsenic; not more than 2 µg/g.

For the following three tests mix 1 volume of Hydrochloric acid with 2 volumes of water:

Bromides and iodides. To 10 mL add 1 mL of chloroform R and add cautiously, a drop at a time with constant stirring, chlorine TS which has been diluted with an equal volume of water; the chloroform remains free from even a transient yellow, orange, or violet colour.

Free bromine and chlorine. To 10 mL add 1 mL of potassium iodide (80 g/l) TS and 1 mL of chloroform R, and shake the mixture; the chloroform remains free from any violet colour for at least 1 minute.

Sulfites. Mix 3 mL with 5 mL of water and add 5 drops of barium chloride (50 g/l) TS and 2 drops of iodine (0.05 mol/l) VS; no turbidity is produced and the colour of the iodine is not completely discharged.

Sulfates. To 20 mL add 40 mg of sodium hydrogen carbonate R and evaporate to dryness on a water-bath; dissolve the residue in 20 mL of water and proceed as described under 2.2.2 Limit test for sulfates; the sulfate content is not more than 20 µg/g.

Residue on ignition. Place 10 g in a porcelain dish and evaporate to dryness on a water-bath. Ignite the residue to constant mass; not more than 0.1 mg/g.

Assay. Add about 1.5 mL, accurately weighed, to a tared glass-stoppered flask containing 20 mL of water; then add 25 mL of water and titrate with sodium hydroxide (1 mol/l) VS, using methyl red/ethanol TS as indicator.

Each mL of sodium hydroxide (1 mol/l) VS is equivalent to 36.46 mg of HCl.