SIGMA-ALDRICH

3050 Spruce Street
Saint Louis, Missouri 63103 USA
Telephone 800-325-5832 • (314) 771-5765
Fax (314) 286-7828
email: techserv@sial.com
sigma-aldrich.com

ProductInformation

HYDROCHLORIC ACID
Sigma Prod. No. H 7020
25,814-8 is an exact replacement for H 7020

CAS NUMBER: 7647-01-0
SYNONYMS: hydrogen chloride solution, muriatic acid

PHYSICAL DESCRIPTION:

Molecular formula: HCl
Molecular weight: 36.46

Hydrochloric acid is a clear colorless liquid which is a solution of hydrogen chloride gas dissolved in water. Reagent grade hydrochloric acid certified by the American Chemical Society (ACS) must assay between 36.5 and 38.0% HCl (titration) and meet ACS criteria regarding trace impurities.[1]

Based on an approximate density of 1.2 g/mL, "concentrated HCl" is in the range 11.6-12.0 M (or N, for this monoprotic acid). Hydrochloric acid is chemically a strong acid; it is totally ionized in water with a K_a value $\approx \infty$. Approximately 83 mL of concentrated HCl poured into sufficient water to make one-liter yields approximately 1.0 N HCl, the pH of which is $\approx$ 0.10; the pH of a 0.01 N solution is $\approx$ 2.02. Hydrochloric acid forms a constant boiling azeotrope with water at 108.6°C, giving a solution containing 20.2% HCl, density 1.096.[2]

Because hydrochloric acid is a gas dissolved in water, the concentrated acid fumes in air; the vapors are extremely corrosive and irritating. Consult the Material Safety Data Sheet for hazard information. Bottles should be well sealed; large bottles should be stored at floor level away from bases in a well-ventilated area.

STABILITY / STORAGE AS SUPPLIED:

The product is stable at room temperature if kept sealed and away from bases and metals. Solubility of HCl gas decreases somewhat with increased temperature. The solution may develop a yellowish color with time due to traces of iron, chlorine or organic matter.

SOLUBILITY / SOLUTION STABILITY:

This is an aqueous solution that can be diluted to any concentration in water, but since the dilution is exothermic, this product should be added carefully to the water.

REFERENCES:

1. *Reagent Chemicals*, 8th Ed., 370-373 (1993).
2. *Merck Index*, 12th Ed., #4821 (1996).