

GHS Classification

ID63

Hydrofluoric acid

CAS 7664-39-3

Date Classified: Mar. 23, 2006

Physical Hazards

Reference Manual: GHS Classification Manual (Feb. 10, 2006)

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Explosives	Not applicable	-	-	-	Containing no chemical groups with explosive properties
2 Flammable gases	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
3 Flammable aerosols	Not applicable	-	-	-	Not aerosol products
4 Oxidizing gases	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
5 Gases under pressure	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
6 Flammable liquids	Not classified	-	-	-	Non-combustible (Hydrogen Fluoride (ICSC, 2004))
7 Flammable solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
8 Self-reactive substances and mixtures	Not applicable	-	-	-	Containing no chemical groups with self-reactivity
9 Pyrophoric liquids	Not classified	-	-	-	Non-combustible (Hydrogen Fluoride (ICSC, 2004))
10 Pyrophoric solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
11 Self-heating substances and mixtures	Not classified	-	-	-	Non-combustible (Hydrogen Fluoride (ICSC, 2004))
12 Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	Containing no metals or metalloids (B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At)
13 Oxidizing liquids	Not classified	-	-	-	No data available, though being inorganic compounds containing fluorine. Based on the classification by the UN Recommendations on the Transport of Dangerous Goods (Division 6.1 and Class 8) (UN#1052 Anhydride and UN#1790 Hydrofluoric Acid).
14 Oxidizing solids	Not applicable	-	-	-	Classified as "liquid" according to GHS definition
15 Organic peroxides	Not applicable	-	-	-	Not organic compounds
16 Corrosive to metals	Classification not possible	-	-	-	Test methods applicable to gaseous substances are not available - boiling point: 20degC (ICSC, 2004), test temperature: 55degC (Hydrogen Fluoride) No data available. Corrosivity to metals remains uncertain, though classified as "corrosive substances" (as the classification based on UN Recommendations on the Transport of Dangerous Goods includes "skin corrosivity") (UN#1790 (Hydrofluoric Acid) (Hydrofluoric Acid).

Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Classification not possible	-	-	-	No data available. Refer to sodium fluoride (CAS No.7681-49-4) for health hazards.
1 Acute toxicity (dermal)	Classification not possible	-	-	-	Insufficient data available
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Due to the fact that the substance is "liquid" according to the GHS definition and inhalation of its gas is not expected.
1 Acute toxicity (inhalation: vapour)	Category 3	Skull and crossbones	Danger	Toxic if inhaled	Based on the LC50 value (4 hours) of 650ppm, calculated from the testing data of rat LC50 (1 hour inhalation of vapour) of 0.79mg/L (CERI Hazard Data 2001-46 (2002)), 1.915mg/L (CERI Hazard Data 2001-46 (2002)), 1.828mg/L (EU-RAR No.8 (2001)), 1.909mg/L (EU-RAR No.8 (2001)), 1.069mg/L (EU-RAR No.8 (2001)), 0.792mg/L (EU-RAR No.8 (2001)), 1.136mg/L (EU-RAR No.8 (2001)), 1.317mg/L (ATSDR (2003)), 1.069mg/L (PATTY (4th, 2000)) and 1.14mg/L (PATTY (4th, 2000)), was lower than 90% of the saturated vapor concentration (1,210,000 ppm) under a saturated vapour pressure of 122kPa (25degC) (Hydrogen Fluoride) (ICSC (2004)), the substance was considered as "vapour containing substantially no mist" and was classified based on standard values expressed in ppm.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 1A-1C	Corrosion	Danger	Causes severe skin burns and eye damage	Based on the testing data of animal eye irritation tests (CERI Hazard Data 2001-46 (2002), EURAR No.8 (2001), ATSDR (2003) and PATTY 4th (2000)) and data on human health effects: Corrosive to the skin. The results of rabbit skin irritation tests suggest the formation of eschar (14 days after the 4-hour application of 5% aqueous solution), although the substance should be placed in Category 1A from the viewpoint of safety.
3 Serious eye damage / eye irritation	Category 1	Corrosion	Danger	Causes serious eye damage	Based on the testing data of animal eye irritation tests (CERI Hazard Data 2001-46 (2002), EURAR No.8 (2001) and ATSDR (2003)) and high-concentration inhalation exposure tests (ATSDR (2003)): Irreversible effects and corrosivity are observed.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Category 1	Exclamation mark	Warning	May cause allergic skin reaction	Respiratory sensitization: Insufficient data available Skin sensitization: based on the description of human health effects (CERI Hazard Data 2001-46 (2002)): "Allergic dermatitis is observed in workers occupationally exposed to the substance," which is thus considered to cause skin sensitization.
5 Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects	Based on the absence of data on multi-generation mutagenicity tests and germ cell mutagenicity tests in vivo, positive data on somatic cell mutagenicity tests in vivo (chromosome aberration tests) and the absence of data on germ cell genotoxicity tests in vivo, described in EU-RAR No.8 (2001).
6 Carcinogenicity	Classification not possible	-	-	-	Classification not possible, due to lack of data (No classification is available, though there are some data on the carcinogenicity; no evidence is observed of an increase in the incidence of osteosarcoma.) Refer to sodium fluoride (CAS No.7681-49-4) for health hazards.
7 Toxic to reproduction	Classification not possible	-	-	-	Insufficient data available Refer to sodium fluoride (CAS No.7681-49-4) for health hazards.

8	Specific target organs/systemic toxicity following single exposure	Category 1 (respiratory organs, pancreas)	Health hazard	Danger	Causes damage to organs (respiratory organs, pancreas)	Based on the human evidence including "damage to the respiratory tract and lung, irritation to the nasal mucosa, conjunctiva and respiratory tract" (EU-RAR No.8 (2001)), "pulmonary hemorrhagic edema, bronchitis, pancreatic hemorrhage and necrosis" (CERI Hazard Data2001-46 (2002)) and the evidence from animal studies including "inflammation of the respiratory organs, pulmonary congestion, alveolar edema, damage to the nasal mucosa (necrosis, inflammation, cellular infiltration, effusion and hemorrhage in the epithelium and submucosal tissues)" (CERI Hazard Data 2001-46 (2002)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1.
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (bone, tooth, pituitary, thyroid gland, kidneys, nervous system, liver, testes, bronchus)	Health hazard	Danger	Causes damage to organs through prolonged or repeated exposure (bone, tooth, pituitary, thyroid gland, kidneys, nervous system, liver, testes, bronchus)	Based on human evidence including "fluorosis of the bone (an increase in bone density, osseous deformity, exostosis, mottled enamel, loss of memory, pituitary/thyroid dysfunction" (CERI Hazard Data2001-46 (2002)), and the evidence from animal studies including "degeneration and necrosis of renal tubules, cerebrospinal dysfunction (a disturbance of conditioned reflex, prolongation of the latent time before the reflex occurs following stimulation), degeneration of nerve cell synapses, diffuse focal necrosis of hepatocytes, fatty degeneration of the hepatic parenchyma, periportal fibrosis, inflammation of the epithelium of the scrotum, ulcer on the scrotum, degenerative changes in the testes" (CERI Hazard Data2001-46 (2002)), "atrophy and edema in the bronchial mucosa, peribronchial hyperplasia" (EU-RAR No.8 (2001)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1.
10	Aspiration hazard	Classification not possible	-	-	-	No data available

Environmental Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
11 Hazardous to the aquatic environment (acute)	Category 3	-	-	Harmful to aquatic life	It was classified into Category 3 from 96 hours EC50=10.5mg/L of the crustacea (Mysid Shrimp) (EU-RAR (2002) and others.).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Although the acute toxicity was Category 3, judging from the NOEC=14.1mg/L during 21 days of the crustacea (Daphnia magna) (EU-RAR, 2002), it was classified into Not classified.