
SECTION 1: Identification

1.1 GHS Product identifier

Product name Chlorine fluoride

1.2 Other means of identification

Product number -

Other names Chlorinemonofluoride;chlorine fluoride;ClF

1.3 Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research uses.

Uses advised against no data available

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

no data available

2.2 GHS label elements, including precautionary statements

Pictogram(s) no data available

Signal word no data available

Hazard statement(s) no data available

Precautionary statement(s)

Prevention no data available

Response no data available

Storage no data available

Disposal no data available

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Chlorine fluoride	Chlorine fluoride	7790-89-8	232-229-9	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer for medical attention.

Following skin contact

First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

4.2 Most important symptoms/effects, acute and delayed

no data available

4.3 Indication of immediate medical attention and special treatment needed, if necessary

no data available

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

In case of fire in the surroundings, use appropriate extinguishing media.

5.2 Specific hazards arising from the chemical

no data available

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours. Avoid contacting with skin and eye. Use personal protective equipment. Wear chemical impermeable gloves. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing SPECIFICALLY RECOMMENDED AS EFFECTIVE AGAINST Chlorine trifluoride, including self-contained breathing apparatus. Ventilation. Turn off gas at source if possible. NEVER direct water jet on liquid.

6.3 Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Fireproof. Separated from combustible substances, reducing agents and food and feedstuffs. Cool. Dry.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

Skin protection

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	NEARLY COLOURLESS COMPRESSED LIQUEFIED GAS WITH CHARACTERISTIC ODOUR.
Colour	no data available
Odour	no data available
Melting point/freezing point	-155.6Â°C
Boiling point or initial boiling point and boiling range	-100Â°C
Flammability	Not combustible but enhances combustion of other substances. Gives off irritating or toxic fumes (or gases) in a fire. Many reactions may cause fire or explosion.
Lower and upper explosion limit/flammability limit	no data available

Flash point	no data available
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	in water: reaction
Partition coefficient n-octanol/water	no data available
Vapour pressure	1.4 atm
Density and/or relative density	1.62 g/cm ³
Relative vapour density	(air = 1): 3.18
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes above 220Å°C . This produces toxic gases of chlorine and fluorine compounds. Reacts violently with water and glass. Reacts with all forms of plastics, rubber and resins, except the highly fluorinated polymers. Most combustible materials ignite spontaneously on contact with this substance. Reacts violently with oxidizable materials, metals and metal oxides. Contact with organic materials causes explosion. Contact with acids causes emission of highly toxic fumes.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

The gas is heavier than air.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

AIR AND WATER REACTIONS: A violent reaction occurs with water or ice generating acidic HF and chlorine, Sidgwick, 1156(1950). The release of Chlorine Trifluoride to the atmosphere rapidly generates two toxic reaction products: HF and Chlorine Dioxide, Lombardi, D.A. and M.D. Cheng 1996. "Modeling Accidental Releases of Chlorine Trifluoride to the Atmosphere," Paper No. 96-WP66B.02, presented at the 89th Annual Meeting of the Air and Waste Management Association, Nashville, Tennessee, June 23-26. CHEMICAL PROFILE: A low-boiling liquid (b.p. 12 C), in gaseous state irritating and toxic. A highly reactive oxidant reagent, spontaneously flammable, used as a rocket propellant. Incompatible with fuels, nitro compounds. Interaction with water is violent and may be explosive, even with ice [Sidgwick, 1950, p. 1156]. Immediate explosive reaction with hydrocarbons or halocarbons even at -70 C [Brower, K. R., J. Fluorine Chem., 1986, 31, p. 333]. Solution with carbon tetrachloride capable of detonation, solutions with nitroaryl compounds (TNT, hexanitrobiphenyl) or highly chlorinated compounds are extremely shock-sensitive. Violent, sometimes explosive reaction with hydrogen containing materials, e.g., acetic acid, ammonia, benzene, ether, coal gas, hydrogen, hydrogen sulfide, methane, or fluoroamino compounds. Ignition with fibrous materials (cotton, paper, wood). [Mellor, 1956, vol. 2, suppl. 1, p. 155]. Explosive gaseous products (chlorodifluoroamine) formed with ammonium fluoride or ammonium hydrogen fluoride [Gardner, D. M. et al., Inorg., Chem., 1963, 2, p. 413]. Ignition on contact with iodine, boron-containing materials (boron powder, tetraboron carbide, boron-aluminum), fibrous or finally divided refractory materials (asbestos, glass, wool, sand, tungsten carbide). Violent reaction with mineral acids (nitric acid, sulfuric acid), chromium trioxide, ruthenium metal, selenium tetrafluoride. [Bretherick, 5th ed., 1995, p. 1235]. Chlorine trifluoride is a hypergolic oxidizer and contact with a number of metals and their oxides (aluminum, antimony, arsenic, calcium, copper, iridium, iron, lithium, lead, magnesium, molybdenum, osmium, potassium, rhodium, sodium, selenium, silver, tellurium, tin, tungsten, zinc), nonmetals (phosphorus, silicon, sulfur), salts (mercury iodide, potassium iodide, silver, nitrate, potassium carbonate) will result in a violent reaction often followed by ignition [Mellor, 1956, vol.2, suppl. 1, p. 155; Sidgwick, 1950, p. 1156]. (REACTIVITY, 1999)

10.6 Hazardous decomposition products

no data available

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

SECTION 12: Ecological information**12.1 Toxicity**

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations**13.1 Disposal methods****Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information**14.1 UN Number**

ADR/RID: UN3310 (For reference only, please check.) IMDG: UN3310 (For reference only, please check.) IATA: UN3310 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (For reference only, please check.) IMDG: LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (For reference only, please check.) IATA: LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 2.3 (For reference only, please check.) IMDG: 2.3 (For reference only, please check.) IATA: 2.3 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: (For reference only, please check.) IMDG: (For reference only, please check.) IATA: (For reference only, please check.)

14.5 Environmental hazards

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Chlorine fluoride	Chlorine fluoride	7790-89-8	232-229-9
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Not Listed.
China Catalog of Hazardous chemicals 2015			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Not Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Not Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Not Listed.
Korea Existing Chemicals List (KECL)			Not Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>