SECTION 1: Identification

1.1 GHS Product identifier

Product name Perchloryl fluoride

1.2 Other means of identification

Product number -
Other names EINECS 231-526-0;Chloryl (per-)fluoride;Chlorine oxyfluoride

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

Acute toxicity - Category 2, Inhalation

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger
Hazard statement(s) H270 May cause or intensify fire; oxidizer
H330 Fatal if inhaled

Precautionary statement(s)
Prevention P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
Response P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P320 Specific treatment is urgent (see ... on this label).
Storage P403+P233 Store in a well-ventilated place. Keep container tightly closed.
Disposal P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

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
Perchloryl fluoride	Perchloryl fluoride	7616-94-6	231-526-0	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

ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. 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

Excerpt from ERG Guide 124 [Gases - Toxic and/or Corrosive - Oxidizing]: TOXIC; may be fatal if inhaled or absorbed through skin. Fire will produce irritating, corrosive and/or toxic gases. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Runoff from fire control may cause pollution. (ERG, 2016)

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

Absorption, Distribution and Excretion

Can be absorbed through skin.

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Excerpt from ERG Guide 124 [Gases - Toxic and/or Corrosive - Oxidizing]: SMALL FIRE: CAUTION: These materials do not burn but will support combustion. Some will react violently with water. Contain fire and let burn. If fire must be fought, water spray or fog is recommended. Water only; no dry chemical, CO2 or HalonÂ®. Do not get water inside containers. Move containers from fire area if you can do it without risk. Damaged cylinders should be handled only by specialists. FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2016)

5.2 Specific hazards arising from the chemical

Excerpt from ERG Guide 124 [Gases - Toxic and/or Corrosive - Oxidizing]: Substance does not burn but will support combustion. Vapors from liquefied gas are initially heavier than air and spread along ground. These are strong oxidizers and will react vigorously or explosively with many materials including fuels. May ignite combustibles (wood, paper, oil, clothing, etc.). Some will react violently with air, moist air and/or water. Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. (ERG, 2016)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. NEVER direct water jet on liquid.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. 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 if in building.USUALLY STORED IN CYLINDERS AS LIQUID UNDER PRESSURE.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 3 ppm as TWA; 6 ppm as STEL

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 safety goggles or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Perchloryl fluoride is a colorless, non corrosive gas with a characteristic sweet odor. Contact with the material may cause irritation to skin, eyes, and mucous membranes. It is very toxic by inhalation and skin absorption. Under prolonged exposure to fire or intense heat the containers may violently rupture and rocket.
Colour	COLORLESS GAS
Odour	CHARACTERISTIC SWEET ODOR
Melting point/freezing point	-146ÂºC
Boiling point or initial boiling point and boiling range	-46.8ÂºC
Flammability	Nonflammable Gas, but will support combustion.
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	3.91X10-3 Pa.s (liq) @ melting point
Solubility	0.06 % (NIOSH, 2016)
Partition coefficient n-octanol/water	no data available
Vapour pressure	10.5 atm (NIOSH, 2016)
Density and/or relative density	1.434
Relative vapour density	3.64
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The substance is a strong oxidant. It reacts violently with combustible and reducing materials. This generates fire and explosion hazard. Reacts violently with nitrogenous bases and finely divided organic materials. This generates fire and explosion hazard. Attacks some forms of plastic, rubber and coatings.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

MODERATE; WHILE NONINFLAMMABLE, IT SUPPORTS COMBUSTION. IT IS POWERFUL OXIDIZER.PERCHLORYL FLUORIDE is a propellant; a powerful oxidant. It ignites upon contact with alcohols, amines, ammonia, beryllium alkyls, boranes, dicyanogen, hydrazines, hydrocarbons, hydrogen, nitroalkanes, powdered metals, silanes, or thiols [Bretherick 1979. p.174]. It may generate hydrofluoric acid if it comes into contact with water.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Powerful oxidizing agent.

10.6 Hazardous decomposition products

When heated to decomp, it emits highly toxic fumes of chlorides & fluorides.

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: Acute inhalation LC50 values for rodents exposed to perchloryl fluoride for 4 hours were 385 ppm in rats and 630 ppm in mice.
- 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

The substance is irritating to the respiratory tract. Inhalation of this gas may cause lung oedema. See Notes. Inhalation of high concentrations may cause formation of methaemoglobin. The liquid may cause frostbite. Medical observation is indicated. The effects may be delayed.

STOT-repeated exposure

The substance may have effects on the blood. This may result in the formation of methaemoglobin. May cause fluorosis. See Notes.

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

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: UN3083 (For reference only, please check.)	IMDG: UN3083 (For reference only, please check.)	IATA: UN3083 (For reference only, please check.)

14.2 UN Proper Shipping Name

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

ADR/RID: No IMDG: No IATA: No

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
Perchloryl fluoride	Perchloryl fluoride	7616-94-6	231-526-0
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			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)			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/

Other Information

Depending on the degree of exposure, periodic medical examination is suggested.Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort.Rest and medical observation is therefore essential.