



Chlorine trifluoride

Safety Data Sheet E-4581

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 10-15-1979

Revision date: 07-28-2023

Supersedes: 01-01-2021

Version: 1.1

SECTION 1: Identification

1.1. Product identifier

Product form : Substance
Substance name : Chlorine trifluoride
CAS No : 7790-91-2
Formula : CIF₃
Other means of identification : Chlorine trifluoride
Product group : Core Products

1.2. Recommended use and restrictions on use

Recommended uses and restrictions : Industrial use; Use as directed.

1.3. Supplier

Linde Canada inc.
500 — 5015 Spectrum Way
Mississauga - Canada L4W 0E4
T 1-905-803-1600 - F 1-905-803-1682
www.lindecana.ca

1.4. Emergency telephone number

Emergency number : 1-800-363-0042
Call emergency number 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product.
For routine information, contact your supplier or Linde sales representative.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-CA classification

Oxidising Gases, Category 1 H270
Gases under pressure : Liquefied gas H280
Acute toxicity (inhalation:gas) Category 2 H330

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms :



Signal word : DANGER

Hazard statements : MAY CAUSE OR INTENSIFY FIRE; OXIDIZER
CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
FATAL IF INHALED
MAY CAUSE FROSTBITE.

Precautionary statements : Keep away from clothing and other combustible materials
Keep valves and fittings free from oil and grease
Wash exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Immediately call a POISON CENTER or doctor
Specific treatment (see First aid measures on this label)
Take off immediately all contaminated clothing and wash it before reuse

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IN CASE OF FIRE: Stop leak if safe to do so
Use and store only outdoors or in a well-ventilated place.
Store locked up
Protect from sunlight. Store in a well-ventilated place.
Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

2.3. Other hazards

Other hazards which do not result in classification : None.

2.4. Unknown acute toxicity (GHS CA)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	CAS No.	% (Vol.)	Common Name (synonyms)
Chlorine trifluoride (Main constituent)	(CAS No) 7790-91-2	100	Chlorine fluoride / Chlorine fluoride (ClF3) / Chlorotrifluoride / Chlorine trifluoride (ClF3)

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.
- First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.
- ,Pay particular attention to skin under the nails,
Soak burned areas in ice and, if available, an aqueous solution of 0.2% benzethonium chloride (aka Hyamine 1622 solution) or zephiran chloride (aka bezalkonium chloride solution) Alternatively, Apply calcium gluconate cream to affected areas on the skin.
- ,
If none of the recommended solutions is available, continue washing in cool water until medical attention arrives. If cream is not available and immersion is impractical, soaked compresses of either solution should be applied to the area.
- ,The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Trained personnel may administer a 1% calcium gluconate solution by continuous drip.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/injuries : No additional information available

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : CONTACT WITH THIS PRODUCT REQUIRES IMMEDIATE MEDICAL ATTENTION! Symptoms may be delayed. Seek medical attention even if no symptoms are present.

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SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

Unsuitable extinguishing media : REACTS VIOLENTLY WITH WATER.

5.3. Specific hazards arising from the hazardous product

Fire hazard : Not flammable. Oxidizing agent; vigorously accelerates combustion. Contact with flammable materials may cause fire or explosion. Ignites many metals at elevated temperatures.

Explosion hazard : Contact with flammables may cause fire or explosion.

Reactivity : EXTREMELY REACTIVE. REACTS VIOLENTLY WITH WATER. Reacts with most substances, including rare gases and some metals. Product will attack many types of clothing, including firefighter's ordinary protective clothing.

Reactivity in case of fire : No reactivity hazard other than the effects described in sub-sections below.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : **DANGER! Toxic, oxidizing, corrosive, high-pressure gas.**

Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Product will attack many types of clothing, including firefighter's ordinary protective clothing.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Other information : Cylinders are **NOT** equipped with a pressure relief valve.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER! Toxic, oxidizing, corrosive, high-pressure gas.** Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. If cylinders are leaking, reduce toxic vapors with water spray or fog. Reverse flow into cylinder may cause rupture. (See section 16.) Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area.

6.2. Methods and materials for containment and cleaning up

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not breathe gas/vapour. Avoid all contact with skin, eyes, or clothing. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Water or organic contamination may cause a violent reaction.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g. wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only where temperature will not exceed 52 °C (125 °F). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap firmly in place by hand. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chlorine trifluoride (7790-91-2)		
USA - ACGIH	ACGIH OEL C [ppm]	0.1 ppm
USA - OSHA	OSHA PEL C	0.4 mg/m ³
USA - OSHA	OSHA PEL (Ceiling) (ppm)	0.1 ppm
Canada (Quebec)	Plafond (OEL C)	0.38 mg/m ³
Canada (Quebec)	Plafond (OEL C) [ppm]	0.1 ppm
Alberta	OEL C	0.4 mg/m ³
Alberta	OEL C [ppm]	0.1 ppm
British Columbia	OEL C [ppm]	0.1 ppm
Manitoba	OEL C [ppm]	0.1 ppm
New Brunswick	OEL C	0.38 mg/m ³
New Brunswick	OEL C [ppm]	0.1 ppm
New Foundland & Labrador	OEL C [ppm]	0.1 ppm
Nova Scotia	OEL C [ppm]	0.1 ppm
Nunavut	OEL C [ppm]	0.1 ppm
Northwest Territories	OEL C [ppm]	0.1 ppm
Ontario	OEL C [ppm]	0.1 ppm
Prince Edward Island	OEL C [ppm]	0.1 ppm
Québec	Plafond (OEL C)	0.38 mg/m ³
Québec	Plafond (OEL C) [ppm]	0.1 ppm
Saskatchewan	OEL C [ppm]	0.1 ppm
Yukon	OEL C	0.4 mg/m ³
Yukon	OEL C [ppm]	0.1 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Use only in a closed system. A corrosion-resistant, forced-draft fume hood is preferred.
LOCAL EXHAUST: A corrosion-resistant system is acceptable.

8.3. Individual protection measures/Personal protective equipment

Hand protection : Where contact with product is possible, such as when changing out cylinders, wear two pairs of gloves—inner gloves of smooth leather and outer gloves of 17 mil nitrile.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible.

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Respiratory protection	: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Thermal hazard protection	: Wear cold insulating gloves when transfilling or breaking transfer connections.
Other information	: Wear safety shoes while handling containers. Keep suitable chemically resistant protective clothing readily available for emergency use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

(a) Physical state	: Gas
(b) Colour	: Colourless. Gives off white fumes in moist air.
(c) Odour	: Sweet. intensely irritating.
Odour threshold	: No data available
(d) Melting point	: -83 °C (-117.4 °F)
Freezing point	: No data available
(e) Boiling point	: 11.5 °C (52.7 °F)
(f) Flammability	: Non flammable
(g) Flammability (solid, gas)	:
(h) Flash point	: Not applicable.
(i) Auto-ignition temperature	: Not applicable.
(j) Decomposition temperature	: No data available
(k) pH	: Not applicable.
(l) Viscosity, kinematic	: Not applicable.
(m) Solubility	: Water: No data available
(n) Partition coefficient – n-octanol/water [log Pow/log Kow]	: Not applicable.
(o) Vapour pressure	: 1.48 bar (21.5 psia) (at 20°C (68°F))
(p) Density	: 3.829 kg/m ³ (0.239 lb/ft ³) (at 21.1°C (70°F) and 1 atm)
Relative gas density	: 3.19 (air = 1) (at 21.1°C (70°F) and 1 atm)
(r) Particle characteristics	: No data available
(s) Molecular mass	: 92.5 g/mol
(t) Critical temperature	: 174 °C (345 °F)
(u) Critical pressure	: 57.7 bar (837.7 psia)
(v) Oxidizing properties	: MAY CAUSE FIRE OR EXPLOSION; STRONG OXIDIZER.
(w) Relative evaporation rate (butylacetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.

9.2. Other information

Gas group	: Liquefied gas
Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

Reactivity	: EXTREMELY REACTIVE. REACTS VIOLENTLY WITH WATER. Reacts with most substances, including rare gases and some metals. Product will attack many types of clothing, including firefighter's ordinary protective clothing.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: May occur.
Conditions to avoid	: Avoid moisture in installation systems. Water or organic contamination may cause a violent reaction.

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Incompatible materials : Reacts with water; Organic materials; Highly reactive material. Reacts with most substances, including rare gases and some metals.

Hazardous decomposition products : Chlorine. Fluorine.

SECTION 11: Toxicological information

11.1 Likely routes of exposure : Inhalation

11.2 Symptoms related to the physical, chemical, and toxicological characteristics : No additional information available

11.3 Delayed and immediate effects and chronic effects

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : FATAL IF INHALED.

Skin corrosion/irritation : Not classified
pH: Not applicable.

Serious eye damage/irritation : Not classified
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

11.4 Toxicity

Chlorine trifluoride (ƴ)7790-91-2	
LC50 inhalation rat (ppm)	149.5 ppm/4h
ATE CA (Gases)	149.5 ppmv/4h

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No data available.

12.2. Persistence and degradability

Chlorine trifluoride (7790-91-2)	
Persistence and degradability	Not applicable for inorganic gases.

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12.3. Bioaccumulative potential

Chlorine trifluoride (7790-91-2)	
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Chlorine trifluoride (7790-91-2)	
Mobility in soil	No data available.
Log Pow	Not applicable.
Log Kow	Not applicable.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Other adverse effects	: May cause pH changes in aqueous ecological systems.
Effect on the ozone layer	: None.
Effect on global warming	: No known effects from this product.

SECTION 13: Disposal considerations

Product/Packaging disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG)	: UN1749
TDG Primary Hazard Classes	: 2.3 - Class 2.3 - Toxic Gases
TDG Subsidiary Classes	: 5.1;8
Proper shipping name	: CHLORINE TRIFLUORIDE
ERAP Index	: 25
Explosive Limit and Limited Quantity Index	: 0
Passenger Carrying Ship Index	: Forbidden
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	: Forbidden

14.2. Air and sea transport

IMDG

UN-No. (IMDG)	: 1749
Proper Shipping Name (IMDG)	: CHLORINE TRIFLUORIDE
Class (IMDG)	: 2 - Gases
MFAG-No	: 124

IATA

UN-No. (IATA)	: 1749
Proper Shipping Name (IATA)	: Chlorine trifluoride
Class (IATA)	: 2 - Gases

SECTION 15: Regulatory information

15.1. National regulations

Chlorine trifluoride (7790-91-2)
Listed on the Canadian NDSL (Non-Domestic Substances List)

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15.2. International regulations

Chlorine trifluoride (7790-91-2)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

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Indication of changes:

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Linde Canada asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

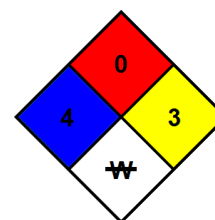
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NFPA health hazard : 4 - Very short exposure could cause death or serious residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA instability : 3 - Capable of detonation or explosive reaction, but requires a strong initiating source or must be heated under confinement before initiation, or reacts explosively with water.

NFPA specific hazard : W - Unusual reactivity with water. This indicates a potential hazard using water to fight a fire involving this material.



HMIS III Rating

Health : 4 Severe Hazard - Life-threatening, major or permanent damage may result from single or repeated overexposures

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 3 Serious Hazard - Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion

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