



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	: Substance
Substance name	: Germanium Tetrafluoride
CAS-No.	: 7783-58-6
Formula	: F ₄ Ge
Other means of identification	: Germanium (IV) Fluoride, tetrafluorogermane

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	: Industrial use; Use as directed.
------------------------------	------------------------------------

1.3. Details of the supplier of the safety data sheet

Linde Inc.
10 Riverview Drive
Danbury, CT 06810-6268, USA
www.lindeus.com

Linde Inc. 1-844-44LINDE (1-844-445-4633)

1.4. Emergency telephone number

Emergency number	: Onsite Emergency: 1-800-645-4633
------------------	------------------------------------

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

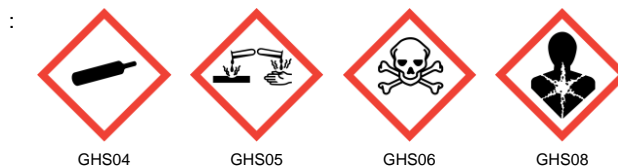
GHS US classification

Press. Gas (Liq.)	H280
Acute Tox. 2 (Inhalation: gas)	H330
Skin Corr. 1B	H314
Eye Dam. 1	H318
STOT RE 1	H372

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US)	: Danger
Hazard statements (GHS US)	: H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE H330 - FATAL IF INHALED H372 - CAUSES DAMAGE TO ORGANS THROUGH PROLONGED OR REPEATED EXPOSURE CGA-HG01 - MAY CAUSE FROSTBITE.
Precautionary statements (GHS US)	: P202 - Do not handle until all safety precautions have been read and understood. P260 - Do not breathe gas P262 - Do not get in eyes, on skin, or on clothing. P264 - Wash exposed skin thoroughly after handling P270 - Do not eat, drink or smoke when using this product.



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

P271+P403 - Use and store only outdoors or in a well-ventilated place.
P280+P284 - Wear protective gloves, protective clothing, eye protection, respiratory protection, and/or face protection.
P304, P340, P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician.
P305, P351, P338, P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
P303, P361, P353, P363, P310 - IF ON SKIN OR (HAIR): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor/physician.
P353 - Rinse skin with water/shower.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with container Supplier/owner instructions
CGA-PG05 - Use a back flow preventive device in the piping.
CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.
CGA-PG12 - Do not open valve until connected to equipment prepared for use.
CGA-PG06 - Close valve after each use and when empty.
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name	Product identifier	%
Germanium Tetrafluoride (Main constituent)	(CAS-No.) 7783-58-6	100

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 : Remove contaminated clothing. Drench affected area with water for at least 15 minutes. 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.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : SMALL FIRES: Dry chemical, carbon dioxide. Foam. LARGE FIRES: Water spray, fog, foam. Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Water.

5.2. Special hazards arising from the substance or mixture

- Reactivity : Reacts with water to form hydrogen fluoride fumes.

5.3. Advice for firefighters

- Firefighting instructions : 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 : **Danger: Toxic. Corrosive.** Wear a self-contained breathing apparatus and appropriate personal protective equipment (PPE). (gas tight, chemical-protective) Evacuate personnel to a safe area. Approach suspected leak area with caution. Remove all sources of ignition. Toxic, corrosive vapor can spread from spill. Ventilate area or move container to a well-ventilated area. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
- Stop flow of product if safe to do so.
- Use water spray or fog to knock down fire fumes if possible.
- Other information : Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Ensure adequate air ventilation. Evacuate area. Monitor concentration of released product. Use chemically protective clothing. Stop leak if safe to do so.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : 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.

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 125°F (52°C). 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.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Germanium Tetrafluoride (7783-58-6)		
ACGIH	ACGIH OEL TWA [ppm]	0.8
ACGIH	Not established	
USA OSHA	Not established	

8.2. Exposure controls

Appropriate engineering controls : Product to be handled in a closed system and under strictly controlled conditions. Use corrosion-proof equipment. Preferably use only permanent leak-tight installations (e.g. welded pipes). Provide adequate general and local exhaust ventilation. Ensure exposure is below occupational exposure limits (where available).

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 work gloves and metatarsal shoes for cylinder handling. Protective equipment where needed. Select in accordance with OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

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.



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Color	: Colorless
Odor	: No data available
Odor threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: No data available
Freezing point	: No data available
Boiling point	: -36.5 °C
Flash point	: No data available
Critical temperature	: 93.7 °C
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: Not applicable.
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Solubility	: Water: No data available
Partition coefficient n-octanol/water (Log Pow)	: Not applicable.
Partition coefficient n-octanol/water (Log Kow)	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosion limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts with water to form hydrogen fluoride fumes.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

Water; Alkali metals; Alkaline earth metals; Calcium oxide; Organic materials; Silica Material.

10.6. Hazardous decomposition products

Germanium and its oxides. Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

Acute toxicity : Not classified

Germanium Tetrafluoride (7783-58-6)	
LC50 Inhalation - Rat [ppm]	280 ppm/1h
ATE US (gases)	163 ppmV/4h

Skin corrosion/irritation : Causes severe skin burns.

pH: Not applicable.

Serious eye damage/irritation : CAUSES SERIOUS EYE DAMAGE.

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : CAUSES DAMAGE TO ORGANS THROUGH PROLONGED OR REPEATED EXPOSURE.

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

Germanium Tetrafluoride (7783-58-6)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Germanium Tetrafluoride (7783-58-6)	
Partition coefficient n-octanol/water (Log Pow)	Not applicable.
Partition coefficient n-octanol/water (Log Kow)	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Germanium Tetrafluoride (7783-58-6)	
Mobility in soil	No data available.

12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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

SECTION 14: Transport information

In accordance with DOT

Transport document description (DOT) : UN3308 Liquefied gas, toxic, corrosive, n.o.s. (Germanium Tetrafluoride), 2.3

UN-No.(DOT) : UN3308

Proper Shipping Name (DOT) : Liquefied gas, toxic, corrosive, n.o.s.
(Germanium Tetrafluoride)

Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

Hazard labels (DOT)

- : Poison Gas
- 2.3 - Poison gas
- 8 - Corrosive



DOT Symbols

- : G - Identifies proper shipping name (PSN) requiring the addition of technical name(s) in parentheses following the PSN, I - Proper shipping name appropriate for international and domestic transportation

DOT Special Provisions (49 CFR 172.102)

- : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- B9 - Bottom outlets are not authorized.
- B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet.

Additional information

Other information

- : No supplementary information available.

Special transport precautions

- : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
 - Ensure there is adequate ventilation.
 - Ensure that containers are firmly secured.
 - Ensure cylinder valve is closed and not leaking.
 - Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
 - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

- UN-No. (IMDG) : 3308
- Proper Shipping Name (IMDG) : LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.
- Class (IMDG) : 2 - Gases
- Division (IMDG) : 2.3 - Toxic gases

Air transport

- UN-No. (IATA) : 3308
- Proper Shipping Name (IATA) : Liquefied gas, toxic, corrosive, n.o.s.
- Class (IATA) : 2 - Gases

SECTION 15: Regulatory information

15.1. US Federal regulations

Germanium Tetrafluoride (7783-58-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

15.2. International regulations

CANADA

Germanium Tetrafluoride (7783-58-6)

Listed on the Canadian NDSL (Non-Domestic Substances List)



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

EU-Regulations

Germanium Tetrafluoride (7783-58-6)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Germanium Tetrafluoride (7783-58-6)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory

Listed on the Japanese ISHL (Industrial Safety and Health Law)

Listed on KECL/KECI (Korean Existing Chemicals Inventory)

Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. US State regulations

Germanium Tetrafluoride(7783-58-6)

U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm



Germanium Tetrafluoride

Safety Data Sheet P-4822

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Issue date: 01/01/1998

Revision date: 01/18/2022 Supersedes: 12/01/2020

Version: 1.1

SECTION 16: Other information

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 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.

The opinions expressed herein are those of qualified experts within Linde Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Linde Inc, it is the user's obligation to determine the conditions of safe use of the product.

Linde SDSs are furnished on sale or delivery by Linde or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your sales representative, local distributor, or supplier, or download from www.lindeus.com. If you have questions regarding Linde SDSs, would like the document number and date of the latest SDS, or would like the names of the Linde suppliers in your area, phone or write the Linde Call Center (Phone: 1-844-44-Linde (1-844-445-4633); Address: Linde Call Center, Linde Inc, P.O. Box 44, Tonawanda, NY 14151-0044).

Linde and the Linde wordmark are trademarks or registered trademarks of Linde plc or its affiliates. The information contained herein is offered for use by technically qualified personnel at their discretion and risk without warranty of any kind.

Copyright © 2021, Linde Inc.

Revision date

: 01/18/2022

NFPA health hazard

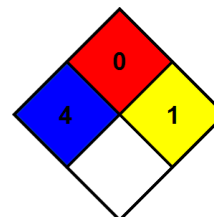
: 4 - Materials that, under emergency conditions, can be lethal.

NFPA fire hazard

: 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA instability

: 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures.



SDS US (GHS HazCom 2012) - Linde 2022

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.