

**GERMANIUM TETRACHLORIDE, 99.9+%****Safety Data Sheet GEG5600**

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Version: 2.0

SECTION 1: Identification**1.1. Identification**

Product name	: GERMANIUM TETRACHLORIDE, 99.9+%
Product code	: GEG5600
Product form	: Substance
Physical state	: Liquid
Formula	: Cl ₄ Ge
Synonyms	: TETRACHLOROGERMANIUM
Chemical family	: GERMANIUM CHLORIDE

1.2. Recommended use and restrictions on use

Recommended use	: Chemical intermediate
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1.3. Supplier**GELEST, INC.**

11 East Steel Road
Morrisville, PA 19067
USA

T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST

info@gelest.com - www.gelest.com
1.4. Emergency telephone number

Emergency number	: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)
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SECTION 2: Hazard(s) identification**2.1. Classification of the substance or mixture****GHS-US classification**

Skin corrosion/irritation Category 1A	H314 Causes severe skin burns and eye damage
Serious eye damage/eye irritation Category 1	H318 Causes serious eye damage
Specific target organ toxicity (single exposure) Category 3	H335 May cause respiratory irritation
Full text of H statements : see section 16	

2.2. GHS Label elements, including precautionary statements**GHS US labeling**

Hazard pictograms (GHS US)



Signal word (GHS US) : Danger

Hazard statements (GHS US) : H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage
H335 - May cause respiratory irritation

Precautionary statements (GHS US) : P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P260 - Do not breathe vapors.
P264 - Wash hands thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. rinse skin with water/shower.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a doctor.
P363 - Wash contaminated clothing before reuse.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P501 - Dispose of contents/container to licensed waste disposal facility.

2.3. Hazards not otherwise classified (HNOC)

Other hazards not contributing to the classification	: Hydrogen chloride may be formed by reaction with water and moisture in air. The US OSHA PEL (TWA) for hydrogen chloride is 5 ppm.
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2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent
Name : GERMANIUM TETRACHLORIDE, 99.9+%
CAS-No. : 10038-98-9

Name	Product identifier	%	GHS-US classification
Germanium tetrachloride	(CAS-No.) 10038-98-9	99 - 100	Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.

First-aid measures after skin contact : Wash with plenty of soap and water. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Never give anything by mouth to an unconscious person. Get medical advice/attention if you feel unwell.

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

Symptoms/effects : Causes severe skin burns and eye damage.

Symptoms/effects after inhalation : May cause respiratory irritation. May be harmful if inhaled.

Symptoms/effects after skin contact : Causes (severe) skin burns.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary

Note to physician: Chlorogermanes react with water to form hydrochloric acid, consequently treatment for acid burns may be considered.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : None.

Unsuitable extinguishing media : Water.

5.2. Specific hazards arising from the chemical

Fire hazard : Irritating fumes and acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Note, since germanium tetrachloride is not flammable, precautions refer to mixtures with flammable materials.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Stop release.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

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6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapor and mist. Provide good ventilation in process area to prevent accumulation of vapors. Avoid contact with water.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tightly closed.

Incompatible materials : Moisture. Water. Bases.

Storage area : Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

GERMANIUM TETRACHLORIDE, 99.9+% (10038-98-9)		
AIHA	WEEL Ceiling (ppm)	0.5 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Handle in an enclosing hood with exhaust ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:

Neoprene or nitrile rubber gloves

Eye protection:

Chemical goggles or face shield. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear liquid.
Molecular mass	: 214.4 g/mol
Color	: No data available
Odor	: Acrid. Similar to hydrogen chloride.
Odor threshold	: No data available
Refractive index	: 1.4644
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: -49 - -52 °C
Boiling point	: 83.1 °C
Flash point	: Not flammable
Critical temperature	: 548 K
Auto-ignition temperature	: No data available

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Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 25 mm Hg @ 0°C; 67 mm Hg @ 20°C
Critical pressure	: 36.6 atm
Relative vapor density at 20 °C	: > 1
Relative density	: 1.879
Solubility	: Reacts with water.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Explosion limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Reacts with water and moisture in air, liberating hydrogen chloride. Reacts violently with bases.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Moisture. Water. Bases.

10.6. Hazardous decomposition products

Acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Germanium tetrachloride (10038-98-9)	
LD50 intravenous mouse	56 mg/kg
LC50 inhalation mouse (2 h)	44000
LC50 inhalation mouse	3535 ppm/4h

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : May cause respiratory irritation.

Specific target organ toxicity – repeated exposure : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Inhalation of large amounts is expected to cause necrosis of tracheal epithelium, bronchitis and interstitial pneumonia. Persistent changes in the respiratory system function have been reported from 4mg/m3. Lasting changes in the respiratory system function have been reported in animals. Other: GENETOX PROGRAM 1986, POSITIVE: B Subtilis rec assay; RTECS# LY5225000.

Symptoms/effects after inhalation : May cause respiratory irritation. May be harmful if inhaled.

Symptoms/effects after skin contact : Causes (severe) skin burns.

Symptoms/effects after eye contact : Causes serious eye damage.

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Symptoms/effects after ingestion : May be harmful if swallowed.
Reason for classification : Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other adverse effects : This substance may be hazardous to the environment.
Effect on the ozone layer : No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.
Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

UN-No.(DOT) : 3390
DOT NA no. : UN3390

14.2. UN proper shipping name

Transport document description : UN3390 Toxic by inhalation liquid, corrosive, n.o.s. (GERMANIUM TETRACHLORIDE), 6.1 (8), I
Proper Shipping Name (DOT) : Toxic by inhalation liquid, corrosive, n.o.s. (GERMANIUM TETRACHLORIDE)
Class (DOT) : 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132
Packing group (DOT) : I - Great Danger
Hazard labels (DOT) : 6.1 - Poison inhalation hazard
8 - Corrosive



DOT Packaging Non Bulk (49 CFR 173.xxx) : 227
DOT Packaging Bulk (49 CFR 173.xxx) : 244
DOT Packaging Exceptions (49 CFR 173.xxx) : None
DOT Symbols : G - Identifies PSN requiring a technical name

14.3. Additional information

Emergency Response Guide (ERG) Number : 154
Other information : No supplementary information available.

Transport by sea

DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

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DOT Quantity Limitations Cargo aircraft only (49 : Forbidden
CFR 175.75)

SECTION 15: Regulatory information

15.1. US Federal regulations

Germanium tetrachloride (10038-98-9)

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

15.2. International regulations

CANADA

Germanium tetrachloride (10038-98-9)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Germanium tetrachloride (10038-98-9)

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

National regulations

Germanium tetrachloride (10038-98-9)

Listed on the AICS (Australian Inventory of Chemical Substances)
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 Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations

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

SECTION 16: Other information

Full text of H-phrases::

H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H335	May cause respiratory irritation

Abbreviations and acronyms

: Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability : 0 Minimal Hazard - Materials that will not burn
Physical : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.

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SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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