# SECTION 1: Identification of the substance/mixture and of the company/undertaking

## 1.1. Product identifier

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product form</td>
<td>Substance</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Substance name</td>
<td>GERMANIUM TETRACHLORIDE, 99.9+%</td>
</tr>
<tr>
<td>Product code</td>
<td>GEG5600</td>
</tr>
<tr>
<td>Formula</td>
<td>Cl₄Ge</td>
</tr>
<tr>
<td>Synonyms</td>
<td>TETRACHLOROGERMANIUM</td>
</tr>
<tr>
<td>Chemical family</td>
<td>GERMANIUM CHLORIDE</td>
</tr>
</tbody>
</table>

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

- Use of the substance/mixture: Chemical intermediate
- For research and industrial use only

## 1.3. Details of the supplier of the safety data sheet

**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)

# SECTION 2: Hazards identification

## 2.1. Classification of the substance or mixture

**Classification (GHS-US)**

- Skin Corr.: 1A - H314  
- Eye Dam.: 1 - H318  
- STOT SE 3 - H335

Full text of H-phrases: see section 16

## 2.2. Label elements

### GHS-US labeling

- Hazard pictograms (GHS-US):
  - GHS05
  - GHS07

- 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. If not better: give artificial respiration
  - 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. Other hazards

Other hazards not contributing to the classification: Hydrogen chloride may be formed by reaction with water and moisture in air. The US OSHA
GERMANIUM TETRACHLORIDE, 99.9+%  
Safety Data Sheet

classification  | PEL (TWA) for hydrogen chloride is 5 ppm.

2.4. Unknown acute toxicity (GHS US)  
No data available

SECTION 3: Composition/information on ingredients

3.1. Substance  
Substance type: Mono-constituent  
Name: GERMANIUM TETRACHLORIDE, 99.9+%  
CAS No: 10038-98-9  
EC no: 233-116-7

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
</table>
| Germanium tetrachloride | (CAS No) 10038-98-9 | 99 - 100 | Skin Corr. 1A, H314  
            |                   |    | Eye Dam. 1, H318  
            |                   |    | STOT SE 3, H335 |

3.2. Mixture  
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, both acute and delayed  
Symptoms/injuries after inhalation: May cause respiratory irritation. May be harmful if inhaled.

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

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

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

4.3. Indication of any immediate medical attention and special treatment needed  
Note to physician: Chlorogermanes react with water to form hydrochloric acid, consequently treatment for acid burns may be considered.

SECTION 5: Firefighting measures

5.1. Extinguishing media  
Suitable extinguishing media: None.

Unsuitable extinguishing media: Water.

5.2. Special hazards arising from the substance or mixture  
Fire hazard: Irritating fumes and acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Advice for firefighters  
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.
GERMANIUM TETRACHLORIDE, 99.9+%
Safety Data Sheet

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

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

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
No additional information available

8.2. Exposure controls
Appropriate engineering controls: Handle in an enclosing hood with exhaust ventilation.
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
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
GERMANIUM TETRACHLORIDE, 99.9+%
Safety Data Sheet

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

10.6. Hazardous decomposition products
Acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified

<table>
<thead>
<tr>
<th>Germanium tetrachloride (10038-98-9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 intravenous mouse</td>
</tr>
<tr>
<td>LC50 inhalation mouse (2 h)</td>
</tr>
<tr>
<td>LC50 inhalation mouse</td>
</tr>
</tbody>
</table>

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 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# LYS225000.

Symptoms/injuries after inhalation : May cause respiratory irritation. May be harmful if inhaled.
Symptoms/injuries after skin contact : Causes (severe) skin burns.
Symptoms/injuries after eye contact : Causes serious eye damage.
Symptoms/injuries 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 ozone layer: No additional information available
Effect on the global warming: No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste 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
Proper Shipping Name (DOT): Toxic by inhalation liquid, corrosive, n.o.s. (GERMANIUM TETRACHLORIDE)
Hazard labels (DOT): 6.1 - Poison
8 - Corrosive

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

14.3. Additional information
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
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75): Forbidden

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
GERMANIUM TETRACHLORIDE, 99.9+%  
Safety Data Sheet

Germanium tetrachloride (10038-98-9)  
Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on the Canadian DSL (Domestic Sustances List)  
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 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

<table>
<thead>
<tr>
<th>regulators</th>
<th>Germanium tetrachloride (10038-98-9)</th>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.S. - California - Proposition 65 - Developmental Toxicity</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

GERMANIUM TETRACHLORIDE, 99.9+% (10038-98-9)

16. OTHER INFORMATION

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.

Full text of H-phrases:
- Eye Dam. 1: Serious eye damage/eye irritation Category 1
- Skin Corr. 1A: Skin corrosion/irritation Category 1A
- STOT SE 3: Specific target organ toxicity (single exposure) Category 3
- H314: Causes severe skin burns and eye damage
- H335: May cause respiratory irritation
- H318: Causes serious eye damage

HMIS III Rating

Health: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability: 0 Minimal Hazard
Physical: 1 Slight Hazard

Prepared by safety and environmental affairs.

Date of issue: 03/04/2015  
Revision date: 08/31/2015  
Version: 2.0

SDS US (GHS HazCom 2012) - Custom

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

The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.