

**GERMANIUM TETRACHLORIDE 99.999%**

Safety Data Sheet GEG5601

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Version: 2.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Product form	: Substance
Physical state	: Liquid
Substance name	: GERMANIUM TETRACHLORIDE 99.999%
Product code	: GEG5601
Formula	: Cl ₄ Ge
Synonyms	: TETRACHLOROGERMANIUM
Chemical family	: GERMANIUM CHLORIDE

1.2. Relevant identified uses of the substance or mixture and uses advised against**1.2.1. Relevant identified uses**

Use of the substance/mixture : Chemical intermediate

1.2.2. Uses advised against

No additional information available

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**GELEST INC.**Fritz-Klatte-Strasse 8
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info@gelestde.com - www.gelestde.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 according to Regulation (EC) No. 1272/2008 [CLP]**

Skin corrosion/irritation, Category 1A	H314
Serious eye damage/eye irritation, Category 1	H318
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335
Full text of H statements : see section 16	
Specific concentration limits: (1 =<C < 100)	STOT SE 3, H335

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements**Labelling according to Regulation (EC) No. 1272/2008 [CLP]**

Hazard pictograms (CLP) :



GHS05



GHS07

GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

Signal word (CLP)	: Danger
Hazard statements (CLP)	: H314 - Causes severe skin burns and eye damage. H335 - May cause respiratory irritation.
Precautionary statements (CLP)	: P280 - Wear protective gloves/protective clothing/eye protection/face protection. P260 - Do not breathe vapours. P264 - Wash hands thoroughly after handling. P403+P233 - Store in a well-ventilated place. Keep container tightly closed. P271 - Use only outdoors or in a well-ventilated area. P310 - Immediately call a POISON CENTER or doctor/physician

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 PEL (TWA) for hydrogen chloride is 5 ppm.
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SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type	: Mono-constituent
Name	: GERMANIUM TETRACHLORIDE 99.999%
CAS-No.	: 10038-98-9
EC-No.	: 233-116-7

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Germanium tetrachloride	(CAS-No.) 10038-98-9 (EC-No.) 233-116-7	99 - 100	Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of 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 person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell.
First-aid measures after skin contact	: Wash with plenty of 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/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. 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.
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GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

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 vapour 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.

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 vapour and mist. Provide good ventilation in process area to prevent formation of vapour. 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.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

GERMANIUM TETRACHLORIDE 99.999% (10038-98-9)		
Latvia	OEL TWA (mg/m ³)	1 mg/m ³
Lithuania	IPRV (mg/m ³)	1 mg/m ³
Germanium tetrachloride (10038-98-9)		
Bulgaria	OEL TWA (mg/m ³)	1 mg/m ³
Latvia	OEL TWA (mg/m ³)	1 mg/m ³
Lithuania	IPRV (mg/m ³)	1 mg/m ³

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:

GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

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
Colour	: No data available
Odour	: Acrid. Similar to hydrogen chloride.
Odour threshold	: No data available
Refractive index	: 1.4644
pH	: No data available
Relative evaporation rate (butylacetate=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
Vapour pressure	: 25 mm Hg @ 0°C; 67 mm Hg @ 20°C
Critical pressure	: 36.6 atm
Relative vapour 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
Oxidising properties	: No data available
Explosive 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 99.999%

Safety Data Sheet

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 sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause respiratory irritation.
STOT-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# 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.
Symptoms/effects after ingestion	: May be harmful if swallowed.
Reason for classification	: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity	: Not classified
Chronic aquatic toxicity	: Not classified

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. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Other adverse effects : This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment 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

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR)	: 3390
UN-No. (IMDG)	: 3390
UN-No. (IATA)	: 3390
UN-No. (ADN)	: 3390
UN-No. (RID)	: 3390

GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

14.2. UN proper shipping name

Proper Shipping Name (ADR)	: TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S.
Proper Shipping Name (IMDG)	: TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S.
Proper Shipping Name (IATA)	: Toxic by inhalation liquid, corrosive, n.o.s.
Proper Shipping Name (ADN)	: TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S.
Proper Shipping Name (RID)	: TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S.
Transport document description (ADR)	: UN 3390 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. (GERMANIUM TETRACHLORIDE), 6.1 (8), I, (C/D)
Transport document description (IMDG)	: UN 3390 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. (GERMANIUM TETRACHLORIDE), 6.1 (8), I
Transport document description (IATA)	: UN 3390 Toxic by inhalation liquid, corrosive, n.o.s. (GERMANIUM TETRACHLORIDE), 6.1
Transport document description (ADN)	: UN 3390 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. (GERMANIUM TETRACHLORIDE), 6.1 (8), I
Transport document description (RID)	: UN 3390 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. (GERMANIUM TETRACHLORIDE), 6.1 (8), I

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR)	: 6.1 (8)
Danger labels (ADR)	: 6.1, 8



IMDG

Transport hazard class(es) (IMDG)	: 6.1 (8)
Danger labels (IMDG)	: 6.1, 8



IATA

Transport hazard class(es) (IATA)	: 6.1 (8)
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ADN

Transport hazard class(es) (ADN)	: 6.1 (8)
Danger labels (ADN)	: 6.1, 8



RID

Transport hazard class(es) (RID)	: 6.1 (8)
Danger labels (RID)	: 6.1, 8



14.4. Packing group

Packing group (ADR)	: I
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GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet


Packing group (IMDG)	: I
Packing group (IATA)	: Not applicable
Packing group (ADN)	: I
Packing group (RID)	: I

14.5. Environmental hazards

Dangerous for the environment	: No
Marine pollutant	: No
Other information	: No supplementary information available

14.6. Special precautions for user

- Overland transport

Classification code (ADR)	: TC1
Special provisions (ADR)	: 274
Limited quantities (ADR)	: 0
Excepted quantities (ADR)	: E0
Packing instructions (ADR)	: P602
Special packing provisions (ADR)	: PP86
Mixed packing provisions (ADR)	: MP8, MP17
Portable tank and bulk container instructions (ADR)	: T20
Portable tank and bulk container special provisions (ADR)	: TP2
Tank code (ADR)	: L10CH
Tank special provisions (ADR)	: TU14, TU15, TE19, TE21
Vehicle for tank carriage	: AT
Transport category (ADR)	: 1
Special provisions for carriage - Loading, unloading and handling (ADR)	: CV1, CV13, CV28
Special provisions for carriage - Operation (ADR)	: S9, S14
Hazard identification number (Kemler No.)	: 668
Orange plates	: 
Tunnel restriction code (ADR)	: C/D
EAC code	: 2XE
APP code	: B

- Transport by sea

Special provisions (IMDG)	: 274
Limited quantities (IMDG)	: 0
Excepted quantities (IMDG)	: E0
Packing instructions (IMDG)	: P602
Tank instructions (IMDG)	: T20
Tank special provisions (IMDG)	: TP2, TP13
EmS-No. (Fire)	: F-A
EmS-No. (Spillage)	: S-B
Stowage category (IMDG)	: D
Stowage and handling (IMDG)	: SW2
Properties and observations (IMDG)	: A variety of toxic liquids which present a highly toxic inhalation hazard as well as being corrosive. Highly toxic if swallowed, by skin contact or by inhalation.

- Air transport

PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: Forbidden
PCA max net quantity (IATA)	: Forbidden
CAO packing instructions (IATA)	: Forbidden

GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

CAO max net quantity (IATA) : Forbidden
ERG code (IATA) : 6C

- Inland waterway transport

Classification code (ADN) : TC1
Special provisions (ADN) : 274, 802
Limited quantities (ADN) : 0
Excepted quantities (ADN) : E0
Equipment required (ADN) : PP, EP, TOX, A
Ventilation (ADN) : VE02
Number of blue cones/lights (ADN) : 2

- Rail transport

Classification code (RID) : TC1
Special provisions (RID) : 274
Limited quantities (RID) : 0
Excepted quantities (RID) : E0
Packing instructions (RID) : P602
Mixed packing provisions (RID) : MP8, MP17
Portable tank and bulk container instructions (RID) : T20
Portable tank and bulk container special provisions (RID) : TP2
Tank codes for RID tanks (RID) : L10CH
Special provisions for RID tanks (RID) : TU14, TU15, TU38, TE21, TE22
Transport category (RID) : 1
Special provisions for carriage - Loading, unloading and handling (RID) : CW13, CW28, CW31
Hazard identification number (RID) : 668

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

GERMANIUM TETRACHLORIDE 99.999% is not on the REACH Candidate List

GERMANIUM TETRACHLORIDE 99.999% is not on the REACH Annex XIV List

GERMANIUM TETRACHLORIDE 99.999% is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

GERMANIUM TETRACHLORIDE 99.999% is not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC

15.1.2. National regulations

Germany

Reference to AwSV : Water hazard class (WGK) 1, Slightly hazardous to water
12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed
SZW-lijst van mutagene stoffen : The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

Denmark

GERMANIUM TETRACHLORIDE 99.999%

Safety Data Sheet

Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment

No additional information available

SECTION 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; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor

Other information : Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

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, Respiratory tract irritation
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

SDS EU (REACH Annex II) - Custom

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