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

1.1. Product identifier

Product form: Substance
Physical state: Solid
Substance name: GERMANIUM DICHLORIDE-DIOXANE COMPLEX
Product code: GEG5180
Formula: Cl₂Ge·C₄H₈O₂
Synonyms: DICHLOROGERMADIYL DIOXANE
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
65933 Frankfurt
Germany
T +49 (0) 69 3535106-500 - F +49 (0) 69 3535106-501 - (M-F): 8:00 AM - 4:00 PM
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 1B H314
Serious eye damage/eye irritation, Category 1 H318

Full text of H statements: see section 16

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): ☢️

Signal word (CLP): Danger

Hazard statements (CLP): H314 - Causes severe skin burns and eye damage.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P260 - Do not breathe dust.
P264 - Wash hands thoroughly after handling.
GERMANIUM DICHLORIDE-DIOXANE COMPLEX
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P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
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 POISON CENTER or doctor/physician

EUH-statements : EUH014 - Reacts violently with water.

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Multi-constituent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>GERMANIUM DICHLORIDE-DIOXANE COMPLEX</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>28595-67-7/10060-11-4</td>
</tr>
<tr>
<td>EC-No.</td>
<td>233-192-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germanium dichloride-dioxane complex</td>
<td>(CAS-No.) 28595-67-7 (EC-No.) 233-192-1</td>
<td>&gt; 95</td>
<td>Skin Corr. 1B, H314 Eye Dam. 1, H318</td>
</tr>
<tr>
<td>Germanium dichloride</td>
<td>(CAS-No.) 10060-11-4</td>
<td>&lt; 5</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

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. IF exposed or concerned: Get medical advice/attention.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

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.

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 irritation to the respiratory tract. Overexposure may cause: Cough. Headache. Nausea.
Symptoms/effects after skin contact : Causes (severe) skin burns. Contact with germanium II compounds causes a yellow discoloration and necrosis of skin.
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
No additional information available

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 : Exercise caution when fighting any chemical fire.
Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe dust.
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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
Protective equipment: Wear protective equipment as described in Section 8.
Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: “Exposure controls/personal protection”.

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

6.3. Methods and material for containment and cleaning up
For containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
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 contact with skin and eyes. Do not breathe dust. Provide local exhaust or general room ventilation to minimize exposure to dust. 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. Store locked up.
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 dichloride (10060-11-4)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA OSHA OSHA PEL (TWA)</td>
<td>6 ppm hydrogen chloride</td>
</tr>
</tbody>
</table>

8.2. Exposure controls

Appropriate engineering controls:
Provide local exhaust or general room 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. NIOSH-certified dust and mist (orange cartridge) respirator.
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SECTION 9: Physical and chemical properties
9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Low-melting solid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>231.63 g/mol</td>
</tr>
<tr>
<td>Colour</td>
<td>Clear to pink-orange.</td>
</tr>
<tr>
<td>Odour</td>
<td>Acrid. Hydrogen bromide.</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.6269</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>106 - 165 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>186.5 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not flammable</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>58.4 mm Hg @ 93.7°C</td>
</tr>
<tr>
<td>Relative vapour density at 20 °C</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>Relative density</td>
<td>3.132</td>
</tr>
<tr>
<td>Solubility</td>
<td>Reacts with water.</td>
</tr>
<tr>
<td>Organic solvent</td>
<td>Soluble: ethanol, toluene, ether</td>
</tr>
<tr>
<td>Log Pow</td>
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</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
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<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
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<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
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</table>

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 in sealed containers in oxygen-free environments.

10.3. Possibility of hazardous reactions
Reacts with warm water and moisture in air liberating hydrogen chloride.

10.4. Conditions to avoid
No additional information available

10.5. Incompatible materials
Moisture. Oxidizing agent. Water:

10.6. Hazardous decomposition products

SECTION 11: Toxicological information
11.1. Information on toxicological effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Classification</th>
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<tbody>
<tr>
<td>Acute toxicity</td>
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</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Causes serious eye damage.</td>
</tr>
<tr>
<td>Respiratory or skin sensitisation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

Print date: 10/04/2019
EN (English)
SDS ID: GEG5180
### Reproductive toxicity
- Not classified

### STOT-single exposure
- Not classified

### 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.

### Symptoms/effects after inhalation

### Symptoms/effects after skin contact
- Causes (severe) skin burns. Contact with germanium II compounds causes a yellow discoloration and necrosis of skin.

### 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
- Sewage disposal recommendations: Do not dispose of waste into sewer.
- 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
- UN-No. (ADR): 1759
- UN-No. (IMDG): 1759
- UN-No. (IATA): 1759
- UN-No. (ADN): 1759
- UN-No. (RID): 1759

#### 14.2. UN proper shipping name
- Proper Shipping Name (ADR): CORROSIVE SOLID, N.O.S.
- Proper Shipping Name (IMDG): CORROSIVE SOLID, N.O.S.
- Proper Shipping Name (IATA): Corrosive solid, n.o.s.
- Proper Shipping Name (ADN): CORROSIVE SOLID, N.O.S.
- Proper Shipping Name (RID): CORROSIVE SOLID, N.O.S.
- Transport document description (IMDG): UN 1759 CORROSIVE SOLID, N.O.S. (GERMANIUM DICHLORIDE-DIOXANE COMPLEX), 8, II
- Transport document description (IATA): UN 1759 Corrosive solid, n.o.s. (GERMANIUM DICHLORIDE-DIOXANE COMPLEX), 8, II
GERMANIUM DICHLORIDE-DIOXANE COMPLEX
Safety Data Sheet

| Transport document description (ADN) | UN 1759 CORROSIVE SOLID, N.O.S. (GERMANIUM DICHLORIDE-DIOXANE COMPLEX), 8, II |
| Transport document description (RID)  | UN 1759 CORROSIVE SOLID, N.O.S. (GERMANIUM DICHLORIDE-DIOXANE COMPLEX), 8, II |

### 14.3. Transport hazard class(es)

#### ADR
- Transport hazard class(es) (ADR): 8
- Danger labels (ADR): 8

#### IMDG
- Transport hazard class(es) (IMDG): 8
- Danger labels (IMDG): 8

#### IATA
- Transport hazard class(es) (IATA): 8
- Hazard labels (IATA): 8

#### ADN
- Transport hazard class(es) (ADN): 8
- Danger labels (ADN): 8

#### RID
- Transport hazard class(es) (RID): 8
- Danger labels (RID): 8

### 14.4. Packing group

- Packing group (ADR): II
- Packing group (IMDG): II
- Packing group (IATA): II
- Packing group (ADN): II
- Packing group (RID): II
14.5. Environmental hazards

<table>
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<tr>
<th>Attribute</th>
<th>Value</th>
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<tbody>
<tr>
<td>Dangerous for the environment</td>
<td>No</td>
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<tr>
<td>Marine pollutant</td>
<td>No</td>
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<tr>
<td>Other information</td>
<td>No supplementary information available</td>
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14.6. Special precautions for user

- Overland transport

<table>
<thead>
<tr>
<th>Classification code (ADR)</th>
<th>C10</th>
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</thead>
<tbody>
<tr>
<td>Special provisions (ADR)</td>
<td>274</td>
</tr>
<tr>
<td>Limited quantities (ADR)</td>
<td>1kg</td>
</tr>
<tr>
<td>Excepted quantities (ADR)</td>
<td>E2</td>
</tr>
<tr>
<td>Packing instructions (ADR)</td>
<td>P002, IBC08</td>
</tr>
<tr>
<td>Special packing provisions (ADR)</td>
<td>B3</td>
</tr>
<tr>
<td>Mixed packing provisions (ADR)</td>
<td>MP10</td>
</tr>
<tr>
<td>Portable tank and bulk container instructions (ADR)</td>
<td>T3</td>
</tr>
<tr>
<td>Limited quantities (ADR)</td>
<td>1kg</td>
</tr>
<tr>
<td>Excepted quantities (ADR)</td>
<td>E2</td>
</tr>
<tr>
<td>Packing instructions (ADR)</td>
<td>P002</td>
</tr>
<tr>
<td>Special packing provisions (ADR)</td>
<td>B3</td>
</tr>
<tr>
<td>Mixed packing provisions (ADR)</td>
<td>MP10</td>
</tr>
<tr>
<td>Portable tank and bulk container special provisions (ADR)</td>
<td>TP33</td>
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<tr>
<td>Hazard identification number (Kemler No.)</td>
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<td>Orange plates</td>
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<tr>
<td>Tunnel restriction code (ADR)</td>
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<tr>
<td>EAC code</td>
<td>2X</td>
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- Transport by sea

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<th>Special provisions (IMDG)</th>
<th>274</th>
</tr>
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<tbody>
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<td>Limited quantities (IMDG)</td>
<td>1 kg</td>
</tr>
<tr>
<td>Excepted quantities (IMDG)</td>
<td>E2</td>
</tr>
<tr>
<td>Packing instructions (IMDG)</td>
<td>P002</td>
</tr>
<tr>
<td>IBC special provisions (IMDG)</td>
<td>B2, B4</td>
</tr>
<tr>
<td>Tank instructions (IMDG)</td>
<td>T3</td>
</tr>
<tr>
<td>Tank special provisions (IMDG)</td>
<td>TP33</td>
</tr>
<tr>
<td>EmS-No. (Fire)</td>
<td>F:A</td>
</tr>
<tr>
<td>EmS-No. (Spillage)</td>
<td>S-B</td>
</tr>
<tr>
<td>Stowage category (IMDG)</td>
<td>A</td>
</tr>
<tr>
<td>Properties and observations (IMDG)</td>
<td>Causes burns to skin, eyes and mucous membranes.</td>
</tr>
</tbody>
</table>

- Air transport

<table>
<thead>
<tr>
<th>PCA Excepted quantities (IATA)</th>
<th>E2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCA Limited quantities (IATA)</td>
<td>Y844</td>
</tr>
<tr>
<td>PCA limited quantity max net quantity (IATA)</td>
<td>5kg</td>
</tr>
<tr>
<td>PCA packing instructions (IATA)</td>
<td>859</td>
</tr>
<tr>
<td>PCA max net quantity (IATA)</td>
<td>15kg</td>
</tr>
<tr>
<td>CAO packing instructions (IATA)</td>
<td>863</td>
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<tr>
<td>CAO max net quantity (IATA)</td>
<td>50kg</td>
</tr>
<tr>
<td>Special provisions (IATA)</td>
<td>A3</td>
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<tr>
<td>ERG code (IATA)</td>
<td>8L</td>
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</tbody>
</table>

- Inland waterway transport

<table>
<thead>
<tr>
<th>Classification code (ADN)</th>
<th>C10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special provisions (ADN)</td>
<td>274</td>
</tr>
</tbody>
</table>
GERMANIUM DICHLORIDE-DIOXANE COMPLEX
Safety Data Sheet

Limited quantities (ADN) : 1 kg
Excepted quantities (ADN) : E2
Equipment required (ADN) : PP, EP
Number of blue cones/lights (ADN) : 0

- Rail transport
Classification code (RID) : C10
Special provisions (RID) : 274
Limited quantities (RID) : 1kg
Excepted quantities (RID) : E2
Packing instructions (RID) : P002, IBC08
Special packing provisions (RID) : B4
Mixed packing provisions (RID) : MP10
Portable tank and bulk container instructions (RID) : T3
Portable tank and bulk container special provisions (RID) : TP33
Tank codes for RID tanks (RID) : SGAN, L4BN
Transport category (RID) : 2
Special provisions for carriage – Packages (RID) : W11
Colis express (express parcels) (RID) : CE10
Hazard identification number (RID) : 80

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 DICHLORIDE-DIOXANE COMPLEX is not on the REACH Candidate List
GERMANIUM DICHLORIDE-DIOXANE COMPLEX is not on the REACH Annex XIV List
GERMANIUM DICHLORIDE-DIOXANE COMPLEX 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.

15.1.2. National regulations

Germany
12th Ordinance Implementing the Federal Immission Control Act - 12.BlmSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands
SZW-lijt van kankerverwekkende stoffen : The substance is not listed
SZW-lijt 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
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:
GERMANIUM DICHLORIDE-DIOXANE COMPLEX
Safety Data Sheet

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:

| H314 | Causes severe skin burns and eye damage. |
| H318 | Causes serious eye damage. |
| EUH014 | Reacts violently with water. |

SDS EU (REACH Annex II) - Custom

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.

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