1 Identification

· Product identifier
  · Trade name: Germanium (10,000µg/mL in 1% HNO3)
  · Article number: 10M20-1

· Details of the supplier of the safety data sheet
  · Manufacturer/Supplier:
    High-Purity Standards
    7221 Investment Drive, North Charleston, SC 29418 United States
    Telephone: +1-843-767-7900
    Fax: +1-843-767-7906
    highpuritystandards.com
    Email: info@highpuritystandards.com

· Information department: Product safety department

· Emergency telephone number:
  INFOTRAC
  Emergency telephone numbers 1-800-535-5053
  Other emergency telephone numbers 1-352-323-3500

2 Hazard(s) identification

· Classification of the substance or mixture
  GHS07
  Skin Irrit. 2  H315  Causes skin irritation.
  Eye Irrit. 2A  H319  Causes serious eye irritation.

· Label elements
  · GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).
  · Hazard pictograms

  GHS07

· Signal word Warning

· Hazard statements
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.

· Precautionary statements
  Wash thoroughly after handling.
  Wear protective gloves / eye protection / face protection.
  If on skin: Wash with plenty of water.
  Specific treatment (see on this label).
  If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  If skin irritation occurs: Get medical advice/attention.
  Take off contaminated clothing and wash it before reuse.
  If eye irritation persists: Get medical advice/attention.

(Contd. on page 2)
Trade name: Germanium (10,000µg/mL in 1% HNO3)

50.0.1 Classification system:
· NFPA ratings (scale 0 - 4)

Health = 2
Fire = 0
Reactivity = 0

· HMIS-ratings (scale 0 - 4)

HEALTH 2
FIRE 0
REACTIVITY 0

· Other hazards
· Results of PBT and vPvB assessment
· PBT: Not applicable.
· vPvB: Not applicable.

3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Description: Mixture of the substances listed below with nonhazardous additions.

· Dangerous components:
7697-37-2 nitric acid 1.0%

· Chemical identification of the substance/preparation
7440-56-4 germanium 1.0%
7732-18-5 water, distilled, conductivity or of similar purity 98.0%

4 First-aid measures

· Description of first aid measures
· General information: Immediately remove any clothing soiled by the product.
· After inhalation: In case of unconsciousness place patient stably in side position for transportation.
· After skin contact: Immediately wash with water and soap and rinse thoroughly.
· After eye contact:
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· After swallowing: If symptoms persist consult doctor.
· Information for doctor:
· Most important symptoms and effects, both acute and delayed No further relevant information available.
· Indication of any immediate medical attention and special treatment needed
No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents: Use fire fighting measures that suit the environment.
· Special hazards arising from the substance or mixture No further relevant information available.
Trade name: Germanium (10,000µg/mL in 1% HNO₃)

· Advice for firefighters
  · Protective equipment: No special measures required.

### 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures** Not required.
- **Environmental precautions:** No special measures required.
- **Methods and material for containment and cleaning up:**
  Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- **Reference to other sections**
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

<table>
<thead>
<tr>
<th>PAC</th>
<th>Substance</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7440-56-4 germanium</td>
<td>3.2 mg/m³</td>
</tr>
<tr>
<td></td>
<td>7697-37-2 nitric acid</td>
<td>0.16 ppm</td>
</tr>
<tr>
<td>2</td>
<td>7440-56-4 germanium</td>
<td>35 mg/m³</td>
</tr>
<tr>
<td></td>
<td>7697-37-2 nitric acid</td>
<td>24 ppm</td>
</tr>
<tr>
<td>3</td>
<td>7440-56-4 germanium</td>
<td>170 mg/m³</td>
</tr>
<tr>
<td></td>
<td>7697-37-2 nitric acid</td>
<td>92 ppm</td>
</tr>
</tbody>
</table>

### 7 Handling and storage

- **Handling:**
  - **Precautions for safe handling** No special precautions are necessary if used correctly.
  - **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
  - **Requirements to be met by storerooms and receptacles:** No special requirements.
  - **Information about storage in one common storage facility:** Not required.
  - **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

### 8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**
  - **Components with limit values that require monitoring at the workplace:**
    - 7697-37-2 nitric acid
    - PEL Long-term value: 5 mg/m³, 2 ppm
50.0.1

REL Short-term value: 10 mg/m³, 4 ppm
Long-term value: 5 mg/m³, 2 ppm

TLV Short-term value: 10 mg/m³, 4 ppm
Long-term value: 5.2 mg/m³, 2 ppm

· Additional information: The lists that were valid during the creation were used as basis.

· Exposure controls
· General protective and hygienic measures:
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Avoid contact with the eyes and skin.
· Breathing equipment: Not required.
· Protection of hands:
  Protective gloves

  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
  Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
  Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· Material of gloves
  The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· Penetration time of glove material
  The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· Eye protection:
  Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties
· General Information
· Appearance:
  Form: Liquid
  Color: colorless
· Odor: Characteristic
· Odor threshold: Not determined.
· pH-value: Not determined.
Trade name: Germanium (10,000µg/mL in 1% HNO3)

<table>
<thead>
<tr>
<th>· Change in condition</th>
<th>· Flash point:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range: Undetermined.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Boiling point/Boiling range: 100 °C (212 °F)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Flammability (solid, gaseous):</th>
<th>· Decomposition temperature:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable.</td>
<td>Not determined.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Auto igniting:</th>
<th>· Danger of explosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product is not selfigniting.</td>
<td>Product does not present an explosion hazard.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Explosion limits:</th>
<th>· Vapor pressure at 20 °C (68 °F):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower: Not determined.</td>
<td>23 hPa (17.3 mm Hg)</td>
</tr>
<tr>
<td>Upper: Not determined.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Density at 20 °C (68 °F):</th>
<th>· Bulk density:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.04829 g/cm³ (8.74798 lbs/gal)</td>
<td>1,048 kg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Relative density</th>
<th>· Vapor density</th>
<th>· Evaporation rate</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>· Solubility in / Miscibility with Water:</th>
<th>· Partition coefficient (n-octanol/water):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not miscible or difficult to mix.</td>
<td>Not determined.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Viscosity:</th>
<th>· Solvent content:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic: Not determined.</td>
<td>Water: 98.0 %</td>
</tr>
<tr>
<td>Kinematic: Not determined.</td>
<td>VOC content: 0.00 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Solids content:</th>
<th>· Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 %</td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

10 Stability and reactivity

<table>
<thead>
<tr>
<th>· Reactivity</th>
<th>· Chemical stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No further relevant information available.</td>
<td>Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Possibility of hazardous reactions</th>
<th>· Conditions to avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>No dangerous reactions known.</td>
<td>No further relevant information available.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>· Incompatible materials:</th>
<th>· Hazardous decomposition products:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No further relevant information available.</td>
<td>No dangerous decomposition products known.</td>
</tr>
</tbody>
</table>
11 Toxicological information

- Information on toxicological effects
  - Acute toxicity:
    - Primary irritant effect:
      - on the skin: Irritant to skin and mucous membranes.
      - on the eye: Irritating effect.
  - Sensitization: No sensitizing effects known.
  - Additional toxicological information:
    The product shows the following dangers according to internally approved calculation methods for preparations:
    Irritant

- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    None of the ingredients is listed.
  - NTP (National Toxicology Program)
    None of the ingredients is listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    None of the ingredients is listed.

12 Ecological information

- Toxicity
  - Aquatic toxicity: No further relevant information available.
  - Persistance and degradability No further relevant information available.
  - Behavior in environmental systems:
  - Bioaccumulative potential No further relevant information available.
  - Mobility in soil No further relevant information available.
  - Additional ecological information:
  - General notes: Not hazardous for water.
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - Other adverse effects No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation: Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

- Uncleaned packagings:
  - Recommendation: Disposal must be made according to official regulations.
## 14 Transport information

<table>
<thead>
<tr>
<th><strong>UN-Number</strong></th>
<th>UN3264</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DOT, ADR, IMDG, IATA</strong></td>
<td></td>
</tr>
<tr>
<td><strong>UN proper shipping name</strong></td>
<td>Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)</td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td>3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)</td>
</tr>
<tr>
<td><strong>ADR</strong></td>
<td>CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)</td>
</tr>
<tr>
<td><strong>IMDG, IATA</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Transport hazard class(es)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td>Class 8 Corrosive substances</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>ADR, IMDG, IATA</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td>8 Corrosive substances</td>
</tr>
<tr>
<td><strong>Label</strong></td>
<td>8</td>
</tr>
<tr>
<td><strong>Packing group</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>DOT, ADR, IMDG, IATA</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental hazards:</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Special precautions for user</strong></td>
<td>Warning: Corrosive substances</td>
</tr>
<tr>
<td><strong>Danger code (Kemler):</strong></td>
<td>80</td>
</tr>
<tr>
<td><strong>EMS Number:</strong></td>
<td>F-A,S-B</td>
</tr>
<tr>
<td><strong>Segregation groups</strong></td>
<td>Acids</td>
</tr>
<tr>
<td><strong>Stowage Category</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Stowage Code</strong></td>
<td>SW2 Clear of living quarters.</td>
</tr>
<tr>
<td><strong>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</strong></td>
<td>Not applicable.</td>
</tr>
<tr>
<td><strong>Transport/Additional information:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Quantity limitations** | On passenger aircraft/rail: 5 L  
On cargo aircraft only: 60 L |
| **ADR** |        |
| **Excepted quantities (EQ)** | Code: E1  
Maximum net quantity per inner packaging: 30 ml  
Maximum net quantity per outer packaging: 1000 ml |
Trade name: Germanium (10,000µg/mL in 1% HNO₃)

- IMDG
- Limited quantities (LQ): 5L
- Excepted quantities (EQ): Code: E1
  - Maximum net quantity per inner packaging: 30 ml
  - Maximum net quantity per outer packaging: 1000 ml
- UN "Model Regulation": UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID), 8, III

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Sara
    - Section 355 (extremely hazardous substances):
      - 7697-37-2 nitric acid
    - Section 313 (Specific toxic chemical listings):
      - 7697-37-2 nitric acid
  - TSCA (Toxic Substances Control Act):
    - All components have the value ACTIVE.
- Hazardous Air Pollutants
  - None of the ingredients is listed.
- Proposition 65
  - Chemicals known to cause cancer:
    - None of the ingredients is listed.
  - Chemicals known to cause reproductive toxicity for females:
    - None of the ingredients is listed.
  - Chemicals known to cause reproductive toxicity for males:
    - None of the ingredients is listed.
  - Chemicals known to cause developmental toxicity:
    - None of the ingredients is listed.
- Carcinogenic categories
  - EPA (Environmental Protection Agency)
    - None of the ingredients is listed.
  - TLV (Threshold Limit Value established by ACGIH)
    - None of the ingredients is listed.
  - NIOSH-Ca (National Institute for Occupational Safety and Health)
    - None of the ingredients is listed.
- GHS label elements
  - The product is classified and labeled according to the Globally Harmonized System (GHS).
Trade name: Germanium (10,000µg/mL in 1% HNO3)

- **Hazard pictograms**
  
  GHS07

- **Signal word** Warning

- **Hazard statements**
  H315 Causes skin irritation.
  H319 Causes serious eye irritation.

- **Precautionary statements**
  Wash thoroughly after handling.
  Wear protective gloves / eye protection / face protection.
  If on skin: Wash with plenty of water.
  Specific treatment (see on this label).
  If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  If skin irritation occurs: Get medical advice/attention.
  Take off contaminated clothing and wash it before reuse.
  If eye irritation persists: Get medical advice/attention.

- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

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**16 Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Department issuing SDS:** Environment protection department.

- **Contact:**
  High-Purity Standards
  Tel: 843-767-7900
  Fax: 843-767-7906

- **Date of preparation / last revision** 12/06/2019 / -

- **Abbreviations and acronyms:**
  ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
  IMDG: International Maritime Code for Dangerous Goods
  DOT: US Department of Transportation
  IATA: International Air Transport Association
  ACGIH: American Conference of Governmental Industrial Hygienists
  EINECS: European Inventory of Existing Commercial Chemical Substances
  ELINCS: European List of Notified Chemical Substances
  NFPA: National Fire Protection Association (USA)
  HMIS: Hazardous Materials Identification System (USA)
  VOC: Volatile Organic Compounds (USA, EU)
  PBT: Persistent, Bioaccumulative and Toxic
  vPvB: very Persistent and very Bioaccumulative
  NIOSH: National Institute for Occupational Safety
  OSHA: Occupational Safety & Health
  TLV: Threshold Limit Value
  PEL: Permissible Exposure Limit
  REL: Recommended Exposure Limit
  Skin Irrit. 2: Skin corrosion/irritation – Category 2
  Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A