

**1 Identification**

- **Product identifier**
- **Product Name:** Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)
- **Part Number:** S1-Ge-1000x100
- **Application of the substance / the mixture** For Laboratory Use Only
- **Uses advised against** Not for Human or Animal Use
- **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: HPS-info@antylia.com
- **Information department:** Product safety department
- **Emergency telephone number:**  
Emergency Phone Number (24 hours)  
INFOTRAC (800-535-5053)  
Outside US: 352-323-3500

**2 Hazard(s) identification**

- **Classification of the substance or mixture**



GHS06 Skull and crossbones

Acute Toxicity - Dermal 3 H311 Toxic in contact with skin.



GHS07

Skin Irritation 2

H315 Causes skin irritation.

Eye Irritation 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**



GHS06



GHS07

- **Signal word** Danger
- **Hazard-determining components of labeling:**  
hydrogen fluoride
- **Hazard statements**  
H311 Toxic in contact with skin.  
H315 Causes skin irritation.  
H319 Causes serious eye irritation.
- **Precautionary statements**  
Wash thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
If on skin: Wash with plenty of water.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Call a poison center/doctor if you feel unwell.  
Specific treatment (see on this label).  
Take off immediately all contaminated clothing and wash it before reuse.  
If skin irritation occurs: Get medical advice/attention.  
If eye irritation persists: Get medical advice/attention.  
Store locked up.  
Dispose of contents/container in accordance with local/regional/national/international regulations.

Printing date 07/03/2024

Reviewed on 07/03/2024

Product Name: Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)

(Contd. of page 1)

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



- HMIS-ratings (scale 0 - 4)



- 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	2.0%
7664-39-3	hydrogen fluoride	0.5%

#### · Chemical identification of the substance/preparation

7732-18-5	water, distilled, conductivity or of similar purity	97.4%
7440-56-4	germanium	0.1%

### 4 First-aid measures

- Description of first aid measures
- General information:  
Immediately remove any clothing soiled by the product.  
In case of irregular breathing or respiratory arrest provide artificial respiration.
- 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.
- Advice for firefighters
- Protective equipment: No special measures required.

### 6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures Not required.
- Environmental precautions:  
Dilute with plenty of water.  
Do not allow to enter sewers/ surface or ground water.
- Methods and material for containment and cleaning up:  
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Dispose contaminated material as waste according to section 13.
- 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.

(Contd. on page 3)

— US —

Product Name: Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)

(Contd. of page 2)

· **Protective Action Criteria for Chemicals**

· <b>PAC-1:</b>		
7664-39-3	hydrogen fluoride	1.0 ppm
7440-56-4	germanium	3.2 mg/m <sup>3</sup>
· <b>PAC-2:</b>		
7664-39-3	hydrogen fluoride	24 ppm
7440-56-4	germanium	35 mg/m <sup>3</sup>
· <b>PAC-3:</b>		
7664-39-3	hydrogen fluoride	44 ppm
7440-56-4	germanium	170 mg/m <sup>3</sup>

**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 section 7.
- **Control parameters**

· <b>Components with limit values that require monitoring at the workplace:</b>	
<b>7697-37-2 nitric acid</b>	
TLV	Short-term value: (4) NIC-0.025 ppm Long-term value: (2) ppm NIC-A4
<b>7664-39-3 hydrogen fluoride</b>	
PEL	Long-term value: 1* mg/m <sup>3</sup> , 3 ppm as F, *sulfuric acid
REL	Long-term value: 2.5 mg/m <sup>3</sup> , 3 ppm Ceiling limit value: 5* mg/m <sup>3</sup> , 6* ppm *15-min, as F
TLV	Long-term value: 0.5 ppm Ceiling limit value: 2 ppm as F; Skin, BEI

· **Ingredients with biological limit values:**

<b>7664-39-3 hydrogen fluoride</b>	
BEI	3 mg/g creatinine Medium: urine Time: prior to shift Parameter: Fluorides (background, nonspecific)
	10 mg/g creatinine Medium: urine Time: end of shift Parameter: Fluorides (background, nonspecific)

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **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.  
Store protective clothing separately.  
Avoid contact with the eyes and skin.

(Contd. on page 4)

Product Name: Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)

(Contd. of page 3)

- **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**

· <b>Information on basic physical and chemical properties</b>	
· <b>General Information</b>	
· <b>Appearance:</b>	
· <b>Form:</b>	Liquid
· <b>Color:</b>	colorless
· <b>Odor:</b>	Characteristic
· <b>Odor threshold:</b>	Not determined.
· <b>pH-value:</b>	Not determined.
· <b>Change in condition</b>	
· <b>Melting point/Melting range:</b>	Undetermined.
· <b>Boiling point/Boiling range:</b>	100 °C (212 °F)
· <b>Flash point:</b>	Not applicable.
· <b>Flammability (solid, gaseous):</b>	Not applicable.
· <b>Decomposition temperature:</b>	Not determined.
· <b>Ignition temperature:</b>	Product is not selfigniting.
· <b>Danger of explosion:</b>	Product does not present an explosion hazard.
· <b>Explosion limits:</b>	
· <b>Lower:</b>	Not determined.
· <b>Upper:</b>	Not determined.
· <b>Vapor pressure at 20 °C (68 °F):</b>	23 hPa (17.3 mm Hg)
· <b>Density at 20 °C (68 °F):</b>	1.00939 g/cm <sup>3</sup> (8.42336 lbs/gal)
· <b>Relative density</b>	Not determined.
· <b>Vapor density</b>	Not determined.
· <b>Evaporation rate</b>	Not determined.
· <b>Solubility in / Miscibility with</b>	
· <b>Water:</b>	Fully miscible.
· <b>Partition coefficient (n-octanol/water):</b> Not determined.	
· <b>Viscosity:</b>	
· <b>Dynamic:</b>	Not determined.
· <b>Kinematic:</b>	Not determined.
· <b>Solvent content:</b>	
· <b>Water:</b>	97.4 %
· <b>VOC content:</b>	0.00 %
	0.0 g/l / 0.00 lb/gal
· <b>Solids content:</b>	0.1 %

(Contd. on page 5)

Product Name: Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)

(Contd. of page 4)

· **Other information** No further relevant information available.

### 10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

### 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

7697-37-2 nitric acid

Inhalative	LC50/4 h	2.65 mg/l (ATE)
------------	----------	-----------------

7664-39-3 hydrogen fluoride

Oral	LD50	1,276 mg/kg (rat)
------	------	-------------------

- **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:  
Toxic  
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.
- **Persistence 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:**  
Water hazard class 1 (Self-assessment): slightly hazardous for water  
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **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.





(Contd. on page 6)

**Product Name: Germanium (1,000 ug/mL in 2% HNO3 + 0.5% HF)**

(Contd. of page 5)

- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

**14 Transport information**

<ul style="list-style-type: none"> <li>· <b>UN-Number</b></li> <li>· <b>DOT, ADR, IMDG, IATA</b></li> </ul>	<p>UN2922</p>
<ul style="list-style-type: none"> <li>· <b>UN proper shipping name</b></li> <li>· <b>DOT</b></li> <li>· <b>ADR</b></li> <li>· <b>IMDG, IATA</b></li> </ul>	<p>Corrosive liquids, toxic, n.o.s. (Nitric acid, Hydrogen fluoride) 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE) CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE)</p>
<ul style="list-style-type: none"> <li>· <b>Transport hazard class(es)</b></li> <li>· <b>DOT</b></li> </ul>	
<ul style="list-style-type: none"> <li>· <b>Class</b></li> <li>· <b>Label</b></li> </ul>	<p>8 Corrosive substances 8, 6.1</p>
<ul style="list-style-type: none"> <li>· <b>ADR</b></li> </ul>	
<ul style="list-style-type: none"> <li>· <b>Class</b></li> <li>· <b>Label</b></li> </ul>	<p>8 (CT1) Corrosive substances 8+6.1</p>
<ul style="list-style-type: none"> <li>· <b>IMDG</b></li> </ul>	
<ul style="list-style-type: none"> <li>· <b>Class</b></li> <li>· <b>Label</b></li> </ul>	<p>8 Corrosive substances 8/6.1</p>
<ul style="list-style-type: none"> <li>· <b>IATA</b></li> </ul>	
<ul style="list-style-type: none"> <li>· <b>Class</b></li> <li>· <b>Label</b></li> </ul>	<p>8 Corrosive substances 8 (6.1)</p>
<ul style="list-style-type: none"> <li>· <b>Packing group</b></li> <li>· <b>DOT, ADR, IMDG, IATA</b></li> </ul>	<p>III</p>
<ul style="list-style-type: none"> <li>· <b>Environmental hazards:</b></li> </ul>	<p>Not applicable.</p>
<ul style="list-style-type: none"> <li>· <b>Special precautions for user</b></li> <li>· <b>Hazard identification number (Kemler code):</b></li> <li>· <b>EMS Number:</b></li> <li>· <b>Segregation groups</b></li> <li>· <b>Stowage Category</b></li> <li>· <b>Stowage Code</b></li> </ul>	<p>Warning: Corrosive substances 86 F-A,S-B (SGG1a) Strong acids B SW2 Clear of living quarters.</p>
<ul style="list-style-type: none"> <li>· <b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b></li> </ul>	<p>Not applicable.</p>

(Contd. on page 7)

**Product Name: Germanium (1,000 ug/mL in 2% HNO3 + 0.5% HF)**

(Contd. of page 6)

· <b>Transport/Additional information:</b>	
· <b>DOT</b>	
· <b>Quantity limitations</b>	On passenger aircraft/rail: 5 L On cargo aircraft only: 60 L
· <b>ADR</b>	
· <b>Excepted quantities (EQ)</b>	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· <b>IMDG</b>	
· <b>Limited quantities (LQ)</b>	5L
· <b>Excepted quantities (EQ)</b>	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· <b>UN "Model Regulation":</b>	UN 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), III

**15 Regulatory information**

· **Safety, health and environmental regulations/legislation specific for the substance or mixture** No further relevant information available.  
· **Sara**

· <b>Section 355 (extremely hazardous substances):</b>	
7664-39-3	hydrogen fluoride

· <b>Section 313 (Specific toxic chemical listings):</b>	
7664-39-3	hydrogen fluoride

· <b>TSCA (Toxic Substances Control Act):</b>		
7732-18-5	water, distilled, conductivity or of similar purity	ACTIVE
7664-39-3	hydrogen fluoride	ACTIVE
7440-56-4	germanium	ACTIVE

· <b>Hazardous Air Pollutants</b>	
7664-39-3	hydrogen fluoride

· <b>Proposition 65</b>	
· <b>Chemicals known to cause cancer:</b>	None of the ingredients is listed.

· <b>Chemicals known to cause reproductive toxicity for females:</b>	None of the ingredients is listed.
--	------------------------------------

· <b>Chemicals known to cause reproductive toxicity for males:</b>	None of the ingredients is listed.
--	------------------------------------

· <b>Chemicals known to cause developmental toxicity:</b>	None of the ingredients is listed.
---	------------------------------------

· <b>Carcinogenic categories</b>	
· <b>EPA (Environmental Protection Agency)</b>	None of the ingredients is listed.

· <b>TLV (Threshold Limit Value)</b>	None of the ingredients is listed.
--------------------------------------	------------------------------------

· <b>NIOSH-Ca (National Institute for Occupational Safety and Health)</b>	None of the ingredients is listed.
---	------------------------------------

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

· **Hazard pictograms**



· **Signal word** Danger

· **Hazard-determining components of labeling:**  
hydrogen fluoride

(Contd. on page 8)

---

**Product Name: Germanium (1,000 ug/mL in 2% HNO<sub>3</sub> + 0.5% HF)**

---

(Contd. of page 7)

**· Hazard statements**

H311 Toxic in contact with skin.  
H315 Causes skin irritation.  
H319 Causes serious eye irritation.

**· Precautionary statements**

Wash thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
If on skin: Wash with plenty of water.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Call a poison center/doctor if you feel unwell.  
Specific treatment (see on this label).  
Take off immediately all contaminated clothing and wash it before reuse.  
If skin irritation occurs: Get medical advice/attention.  
If eye irritation persists: Get medical advice/attention.  
Store locked up.  
Dispose of contents/container in accordance with local/regional/national/international regulations.

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

---

**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  
Telephone: +1-843-767-7900  
Fax: +1-843-767-7906  
Email: HPS-Info@antylia.com

· **Date of preparation / last revision** 07/03/2024 / -

**· Abbreviations and acronyms:**

ADR: Accord relatif au transport international 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  
EINECS: European Inventory of Existing Commercial Chemical Substances  
ELINCS: European List of Notified Chemical Substances  
CAS: Chemical Abstracts Service (division of the American Chemical Society)  
NFPA: National Fire Protection Association (USA)  
HMIS: Hazardous Materials Identification System (USA)  
VOC: Volatile Organic Compounds (USA, EU)  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
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  
BEL: Biological Exposure Limit  
Acute Toxicity - Dermal 3: Acute toxicity – Category 3  
Skin Irritation 2: Skin corrosion/irritation – Category 2  
Eye Irritation 2A: Serious eye damage/eye irritation – Category 2A