1 Identification

· Product identifier

· Trade name: Zirconium 1000 μg/mL 2% HNO3 + 0.5% HF

· Article number: 100069-3

· Details of the supplier of the safety data sheet

· Manufacturer/Supplier:
  High-Purity Standards
  PO Box 41727 Charleston, SC 29423 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

  GHS06 Skull and crossbones

  Acute Tox. 3 H311 Toxic in contact with skin.

  GHS05 Corrosion

  Met. Corr.1 H290 May be corrosive to metals.
  Skin Corr. 1A H314 Causes severe skin burns and eye damage.
  Eye Dam. 1 H318 Causes serious eye damage.

  GHS07

  Acute Tox. 4 H302 Harmful if swallowed.

· Label elements

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

· Hazard pictograms

  GHS05 GHS06

· Signal word Danger

(Contd. on page 2)
Trade name: Zirconium 1000 μg/mL 2% HNO3 + 0.5% HF

· Hazard-determining components of labeling:
  nitric acid
  hydrofluoric acid

· Hazard statements
  H290 May be corrosive to metals.
  H302 Harmful if swallowed.
  H311 Toxic in contact with skin.
  H314 Causes severe skin burns and eye damage.

· Precautionary statements
  Keep only in original container.
  Do not breathe dusts or mists.
  Wash thoroughly after handling.
  Do not eat, drink or smoke when using this product.
  Wear protective gloves/protective clothing/eye protection/face protection.
  If swallowed: Call a poison center/doctor if you feel unwell.
  If swallowed: Rinse mouth. Do NOT induce vomiting.
  If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
  Continue rinsing.
  Immediately call a poison center/doctor.
  Specific treatment (see on this label).
  Absorb spillage to prevent material damage.
  Store locked up.
  Store in corrosive resistant container with a resistant inner liner.
  Dispose of contents/container in accordance with local/regional/national/international regulations.

· Classification system:
  · NFPA ratings (scale 0 - 4)
    Health = 3
    Fire = 0
    Reactivity = 0
  · HMIS-ratings (scale 0 - 4)
    HEALTH Health = 3
    FIRE Fire = 0
    REACTIVITY 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.
# Safety Data Sheet

Trade name: Zirconium 1000 μg/mL 2% HNO₃ + 0.5% HF

## 4 First-aid measures

### General information:
- Immediately remove any clothing soiled by the product.
- Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- 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. Then consult a doctor.

### After swallowing:
- Immediately call a doctor.
- Drink copious amounts of water and provide fresh air. Immediately call a 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
- During heating or in case of fire poisonous gases are produced.

### Advice for firefighters
- Protective equipment: Mouth respiratory protective device.

## 6 Accidental release measures

### Personal precautions, protective equipment and emergency procedures
- Mount respiratory protective device.
- Wear protective equipment. Keep unprotected persons away.

### Environmental precautions
- Dilute with plenty of water.

### Methods and material for containment and cleaning up:
- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- Use neutralizing agent.
- Dispose contaminated material as waste according to item 13.
- Ensure adequate ventilation.
Trade name: Zirconium 1000 μg/mL 2% HNO₃ + 0.5% HF

- **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**

  - **PAC-1:**
    - 7697-37-2 nitric acid
    - 7440-67-7 zirconium
    - 0.16 ppm
    - 10 mg/m³

  - **PAC-2:**
    - 7697-37-2 nitric acid
    - 7440-67-7 zirconium
    - 24 ppm
    - 83 mg/m³

  - **PAC-3:**
    - 7697-37-2 nitric acid
    - 7440-67-7 zirconium
    - 92 ppm
    - 500 mg/m³

**7 Handling and storage**

- **Handling:**
  - **Precautions for safe handling**
  - Ensure good ventilation/exhaustion at the workplace.
  - Prevent formation of aerosols.
  - **Information about protection against explosions and fires:** Keep respiratory protective device available.

- **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 |
      | **REL** | Short-term value: 10 mg/m³, 4 ppm |
      | **TLV** | Short-term value: 10 mg/m³, 4 ppm |

(Contd. on page 5)
Trade name: Zirconium 1000 μg/mL 2% HNO₃ + 0.5% HF

### 7664-39-3 hydrofluoric acid

<table>
<thead>
<tr>
<th>PEL</th>
<th>Long-term value: 3 ppm as F</th>
</tr>
</thead>
<tbody>
<tr>
<td>REL</td>
<td>Long-term value: 2.5 mg/m³, 3 ppm</td>
</tr>
<tr>
<td></td>
<td>Ceiling limit value: 5* mg/m³, 6* ppm</td>
</tr>
<tr>
<td></td>
<td>*15-min, as F</td>
</tr>
<tr>
<td>TLV</td>
<td>Long-term value: 0.41 mg/m³, 0.5 ppm</td>
</tr>
<tr>
<td></td>
<td>Ceiling limit value: 1.64 mg/m³, 2 ppm</td>
</tr>
<tr>
<td></td>
<td>as F; Skin; BEI</td>
</tr>
</tbody>
</table>

**Ingredients with biological limit values:**

<table>
<thead>
<tr>
<th>7664-39-3 hydrofluoric acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEI 3 mg/g creatinine</td>
</tr>
<tr>
<td>Medium: urine</td>
</tr>
<tr>
<td>Time: prior to shift</td>
</tr>
<tr>
<td>Parameter: Flourides (background)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 mg/g creatinine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium: urine</td>
</tr>
<tr>
<td>Time: end of shift</td>
</tr>
<tr>
<td>Parameter: Flourides (background)</td>
</tr>
</tbody>
</table>

**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.
- Avoid contact with the eyes and skin.

**Breathing equipment:**
- In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

**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 cannot be calculated in advance and has therefore to be checked prior to the application.
Trade name: Zirconium 1000 μg/mL 2% HNO₃ + 0.5% HF

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.

- Change in condition
  - Melting point/Melting range: Undetermined.
  - Boiling point/Boiling range: Undetermined.

- Flash point: Not applicable.

- Flammability (solid, gaseous): Not applicable.

- Decomposition temperature: Not determined.

- Auto igniting: Product is not selfigniting.

- Danger of explosion: Product does not present an explosion hazard.

- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.

- Vapor pressure at 20 °C (68 °F): 23 hPa (17.3 mm Hg)

- Density at 20 °C (68 °F): 1.01061 g/cm³ (8.43354 lbs/gal)

- Bulk density: 1,011 kg/m³
- Relative density: Not determined.
- Vapor density: Not determined.
- Evaporation rate: Not determined.

- Solubility in / Miscibility with Water: Fully miscible.

- Partition coefficient (n-octanol/water): Not determined.

- Viscosity:
  - Dynamic: Not determined.
Trade name: Zirconium 1000 μg/mL 2% HNO3 + 0.5% HF

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:
  - Primary irritant effect:
    - on the skin: Strong caustic effect on skin and mucous membranes.
    - on the eye: Strong caustic effect.
    - Strong irritant with the danger of severe eye injury.
- Sensitization: No sensitizing effects known.
- Additional toxicological information:
  The product shows the following dangers according to internally approved calculation methods for preparations:
  Toxic
  Harmful
  Corrosive
  Irritant
  Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
- 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:**
  - Not hazardous for water.
  - Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- **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.
  - **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

- **UN-Number**
  - DOT, ADR, IMDG, IATA: UN2922

- **UN proper shipping name**
  - **DOT**
  - **ADR**
  - **IMDG, IATA**

- **Transport hazard class(es)**
  - **DOT**
    - Class 8 Corrosive substances
### Trade name: Zirconium 1000 µg/mL 2% HNO₃ + 0.5% HF

<table>
<thead>
<tr>
<th>Label</th>
<th>8, 6.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR</td>
<td>8 Corrosive substances</td>
</tr>
<tr>
<td>Class</td>
<td>8+6.1</td>
</tr>
<tr>
<td>Label</td>
<td>8/6.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>Label</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
</tr>
<tr>
<td>Label</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Packing group</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT, ADR, IMDG, IATA</td>
</tr>
</tbody>
</table>

**Environmental hazards:** Not applicable.

<table>
<thead>
<tr>
<th>Special precautions for user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning: Corrosive substances</td>
</tr>
<tr>
<td>Danger code (Kemler):</td>
</tr>
<tr>
<td>EMS Number:</td>
</tr>
<tr>
<td>Segregation groups</td>
</tr>
<tr>
<td>Stowage Category</td>
</tr>
<tr>
<td>Stowage Code</td>
</tr>
</tbody>
</table>

**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

<table>
<thead>
<tr>
<th>Transport/Additional information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
</tr>
<tr>
<td>Quantity limitations</td>
</tr>
<tr>
<td>On cargo aircraft only: 60 L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excepted quantities (EQ)</td>
</tr>
<tr>
<td>Code: E1</td>
</tr>
<tr>
<td>Maximum net quantity per inner packaging: 30 ml</td>
</tr>
<tr>
<td>Maximum net quantity per outer packaging: 1000 ml</td>
</tr>
</tbody>
</table>

(Contd. of page 8)
Trade name: Zirconium 1000 μg/mL 2% HNO3 + 0.5% HF

- IMDG
- Limited quantities (LQ): 5L
  Code: E1
  Maximum net quantity per inner packaging: 30 ml
  Maximum net quantity per outer packaging: 1000 ml
- Excepted quantities (EQ)
- UN "Model Regulation": UN 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (HYDROFLUORIC ACID, NITRIC ACID), 8 (6.1), 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):
  - 7732-18-5 water, distilled, conductivity or of similar purity ACTIVE
  - 7697-37-2 nitric acid ACTIVE
  - 7440-67-7 zirconium 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)
  7440-67-7 zirconium A4
- 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: Zirconium 1000 μg/mL 2% HNO₃ + 0.5% HF

- **Hazard pictograms**
  - GHS05
  - GHS06

- **Signal word** Danger

- **Hazard-determining components of labeling:**
  - nitric acid
  - hydrofluoric acid

- **Hazard statements**
  - H290 May be corrosive to metals.
  - H302 Harmful if swallowed.
  - H311 Toxic in contact with skin.
  - H314 Causes severe skin burns and eye damage.

- **Precautionary statements**
  - Keep only in original container.
  - Do not breathe dusts or mists.
  - Wash thoroughly after handling.
  - Do not eat, drink or smoke when using this product.
  - Wear protective gloves/protective clothing/eye protection/face protection.
  - If swallowed: Call a poison center/doctor if you feel unwell.
  - If swallowed: Rinse mouth. Do NOT induce vomiting.
  - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
  - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - Immediately call a poison center/doctor.
  - Specific treatment (see on this label).
  - Take off immediately all contaminated clothing and wash it before reuse.
  - Absorb spillage to prevent material damage.
  - Store locked up.
  - Store in corrosive resistant container with a resistant inner liner.
  - Dispose of contents/container in accordance with local/regional/national/international regulations.

- **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** 08/27/2019 /
- **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

(Contd. on page 12)
**Trade name:** Zirconium 1000 μg/mL 2% HNO3 + 0.5% HF

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  
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)  
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  
BEI: Biological Exposure Limit  
Acute Tox. 4: Acute toxicity – Category 1  
Acute Tox. 3: Acute toxicity – Category 3  
Skin Corr. 1A: Skin corrosion/irritation – Category 1A  
Eye Dam. 1: Serious eye damage/eye irritation – Category 1