

## Safety Data Sheet

### Section 1. Product and Company Identification

Product Identification: 1000 µg/mL Hafnium in 2% HNO<sub>3</sub> + 0.5% HF  
MSDS Number: 100022-3  
Recommended Use: For Laboratory Use.  
Company Identification: High-Purity Standards  
P.O. Box 41727  
Charleston, SC 29423  
Telephone: (843) 767-7900  
FAX: (843) 767-7906

In case of emergency call INFOTRAC: 800-535-5053

### Section 2. Hazard Identification

**Classification:**

Skin Corrosion/Irritation, Category 1

Serious Eye Damage/ Eye Irritation, Category 1

**Labeling:**



**Symbol:**

**Signal Word:** Danger.

**Hazard Statement:** Causes severe skin burns and eye damage.

**Precautionary Statement:** Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling.

### Section 3. Composition

| Component         | CAS/EINECS Registry # | Percent Concentration |
|-------------------|-----------------------|-----------------------|
| Hafnium           | 7440-58-6/231-166-4   | 0.1                   |
| Nitric Acid       | 7697-37-2/ 231-714-2  | 2                     |
| Hydrofluoric Acid | 7664-39-3/231-634-8   | 0.5                   |
| Water, deionized  | 7732-18-5/ 231-791-2  | Balance               |

### Section 4. First Aid Measures

**IF ON SKIN (or hair):** Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Rub calcium gluconate gel immediately to skin. Obtain medical assistance. Wash contaminated clothing before reuse.

**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/physician.

**IF SWALLOWED:** Rinse mouth. Do NOT induce vomiting.

**IF INHALED:** Remove to fresh air and keep at rest in a position comfortable for breathing.

**Target Organs:** Eyes, skin, respiratory system, teeth, and skeletal system.

|   |                            |                    |
|---|----------------------------|--------------------|
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| <b>1000 ~g/mL Hafnium in 2%<math>\text{HNO}_3</math>+0.5%<math>\text{HF}</math></b> | <b>Revision: 001</b>       | <b>Page 2 of 4</b> |

## Section 5. Fire Fighting Measures

Fire & Explosion hazards: While nitric acid is not combustible, it is a strong oxidizing agent that can react with combustible materials; however, it is present in limited quantities in this solution.  $\text{NO}_x$  compounds can be released in case of fire. Hydrofluoric acid may ignite or explode on contact with combustible materials.

Extinguishing Media: Use any extinguishing media that is suitable for the surrounding area. Use a water spray to dilute nitric acid and to absorb liberated nitrogen oxides.

Specific Methods: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

## Section 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Do not allow to enter drainage systems or water ways. Dike area and dilute spill with water and neutralize with soda ash, limestone, etc. Place the neutralized material into containers suitable for eventual disposal, reclamation, or destruction. Always dispose of in accordance with local regulations.

## Section 7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Keep out of direct sunlight and away from heat, water, and incompatible materials. When diluting, the acid should always be added slowly to water and in small amounts. Refer to Section 8 for personal handling instructions.

## Section 8. Exposure Controls and Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep any buildup of airborne contaminants below their respective threshold limit value. Ensure the availability of eyewash stations and safety showers.

Personal Protection: Wear appropriate gloves impermeable to HF, safety glasses with face shield, and lab coat/apron to avoid any direct skin contact.

### Exposure Limits:

| Component         | ACGIH TLV             | OSHA PEL                               |
|-------------------|-----------------------|--|
| Hafnium           | 0.5 mg/m <sup>3</sup> | 0.5 mg/m <sup>3</sup>                  |
| Nitric Acid       | 2 mg/kg               | 5 mg/m <sup>3</sup>                    |
| Hydrofluoric Acid | C: 3 mg/ml            | 2.5 mg/m <sup>3</sup><br>STEL: 6 mg/ml |

## Section 9. Physical and Chemical Properties

Physical State: Liquid

Color: Clear, colorless liquid

Odor: Odorless to a faint pungent odor

Odor threshold: None

pH: <2

Melting point: N/A

Freezing Point: N/A

Boiling Point: Approximately 100°C

Flash point: N/A

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Evaporation rate: N/A  
 Flammability: N/A  
 Explosion limits: N/A  
 Vapor Pressure (mm): N/A  
 Vapor Density (air+1): N/A  
 Relative density: ( $\text{H}_2\text{O} = 1$ ): Approximately 1.0  
 Solubility in  $\text{H}_2\text{O}$ : Complete  
 Auto ignition temperature: N/A  
 Decomposition temperature: N/A  
 Molecular Weight: 178.49 (Hf)

#### Section 10. Stability and Reactivity

Stability Indicator: YES  
 Conditions to Avoid: Avoid heat and contact with combustible and other incompatible materials.  
 Incompatibles: Strong reducing agents, metallic powders, strong bases, chlorine, calcium compounds, hydroxides, organic materials, strong alkali, cyanides.  
 Hazardous Decomposition Products:  $\text{HF}$  and  $\text{NO}_x$  compounds including nitric oxide ( $\text{NO}$ ), nitrogen dioxide ( $\text{NO}_2$ ), nitrous oxide ( $\text{N}_2\text{O}$ ) and nitric acid mist or vapor.  
 Hazardous Polymerization: Will not occur.

#### Section 11. Toxicological Information

May cause severe irritation/burns to respiratory system and areas of contact. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. The symptoms may be delayed.

**RTECS#**

$\text{HNO}_3$ ; QU5775000

Hf; MG4600000

$\text{HF}$ ; MW7875000

$\text{LD}_{\text{LO}}$  Oral, Human: (Nitric Acid) 430 mg/kg.

$\text{LC}_{\text{LO}}$  Inhalation, Human: ( $\text{HF}$ ) 50 mg/kg/30 min

#### Section 12. Ecological Information

Ecotoxicological information: Do not allow material to reach ground water, water bodies, or sewage system.

#### Section 13. Disposal Considerations

General: Follow Federal, state and local regulations for waste.

#### Section 14. Transport Information

D.O.T. Classification: Hazardous by IATA and 49CFR regulations (based on concentration of acid).  
 D.O.T. Shipping Name: Corrosive liquid, Acidic, Inorganic, n.o.s. (Nitric Acid Solution)  
 D.O.T. Hazard Class: 8  
 U.N./N.A. Number: 3264  
 Packing Group: II  
 D.O.T. Label: Corrosive (8)

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#### Section 15. Regulations (Not meant to be all inclusive-selected regulation listed)

TSCA Status: Components of this solution are listed on the TSCA Inventory.

RCRA Status: Yes (Hydrofluoric Acid-U134)

SARA: Subject to the reporting requirements of Section 313 of SARA Title III and of 40 CFR 372

Risk Phrases: R20/21/22, R24, R25, R34 Harmful by inhalation, skin contact, or if ingested.

Toxic in contact with skin. Toxic if swallowed. Causes burns.

Safety Phrases: S24, S25, S36/37/39 Avoid contact with the skin. Avoid contact with eyes. Wear suitable protective clothing, gloves and eye/face protection

WHMIS Information (Canada): E: Corrosive

D1A: Very Toxic Material Causing Immediate and Serious Toxic Effects

#### Section 16. Other Information

HPS products are intended for laboratory use only. All products should be handled and used by trained professional personnel only. The responsibility for the safe handling and use of these products rests solely with the buyer and/or user. The SDS was prepared carefully and represents the best data currently available to us; however, HPS does not certify the data on the SDS.

Certified values for this material are given only on the Certificate of Analysis.

Theodore C. Rains, Ph.D.