

## Safety Data Sheet

acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

### 1 Identification

- **Product identifier**
- **Trade name:** Hafnium
- **Article number:** 10M22-3
- **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**



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.

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

(Contd. on page 2)

US

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 1)

nitric acid

**Hazard statements**

- H290 May be corrosive to metals.
- 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.
- Wear protective gloves/protective clothing/eye protection/face protection.
- 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.

**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	4.0%
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(Contd. on page 3)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 2)

7664-39-3	hydrogen fluoride	2.0%
7440-58-6	hafnium	1.0%
<b>· Chemical identification of the substance/preparation</b>		
7732-18-5	water, distilled, conductivity or of similar purity	93.0%

**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. Then consult a doctor.
- **After swallowing:** 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.  
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).  
Use neutralizing agent.  
Dispose contaminated material as waste according to item 13.  
Ensure adequate ventilation.

(Contd. on page 4)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 3)

- **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	0.16 ppm
7664-39-3	hydrogen fluoride	1.0 ppm
7440-58-6	hafnium	1.5 mg/m <sup>3</sup>

· **PAC-2:**

7697-37-2	nitric acid	24 ppm
7664-39-3	hydrogen fluoride	24 ppm
7440-58-6	hafnium	17 mg/m <sup>3</sup>

· **PAC-3:**

7697-37-2	nitric acid	92 ppm
7664-39-3	hydrogen fluoride	44 ppm
7440-58-6	hafnium	99 mg/m <sup>3</sup>

**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/m <sup>3</sup> , 2 ppm

(Contd. on page 5)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 4)

REL Short-term value: 10 mg/m<sup>3</sup>, 4 ppm  
Long-term value: 5 mg/m<sup>3</sup>, 2 ppm

TLV Short-term value: 10 mg/m<sup>3</sup>, 4 ppm  
Long-term value: 5.2 mg/m<sup>3</sup>, 2 ppm

**7664-39-3 hydrogen fluoride**

PEL Long-term value: 3 ppm  
as F

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: 0.41 mg/m<sup>3</sup>, 0.5 ppm  
Ceiling limit value: 1.64 mg/m<sup>3</sup>, 2 ppm  
as F; Skin, BEI

**7440-58-6 hafnium**

PEL Long-term value: 0.5 mg/m<sup>3</sup>  
as Hf

REL Long-term value: 0.5 mg/m<sup>3</sup>  
as Hf

TLV Long-term value: 0.5 mg/m<sup>3</sup>  
as Hf

**· Ingredients with biological limit values:**

**7664-39-3 hydrogen fluoride**

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.
- Avoid contact with the eyes and skin.

(Contd. on page 6)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 5)

· **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 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:**

· <b>Form:</b>	Liquid
· <b>Color:</b>	colorless
· <b>Odor:</b>	Characteristic
· <b>Odor threshold:</b>	Not determined.

· **pH-value:** Not determined.

· **Change in condition**

· <b>Melting point/Melting range:</b>	Undetermined.
· <b>Boiling point/Boiling range:</b>	100 °C (212 °F)

· **Flash point:** Not applicable.

· **Flammability (solid, gaseous):** Not applicable.

· **Decomposition temperature:** Not determined.

(Contd. on page 7)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 6)

· <b>Auto igniting:</b>	<i>Product is not selfigniting.</i>
· <b>Danger of explosion:</b>	<i>Product does not present an explosion hazard.</i>
· <b>Explosion limits:</b> <b>Lower:</b> <b>Upper:</b>	<i>Not determined. Not determined.</i>
· <b>Vapor pressure at 20 °C (68 °F):</b>	<i>23 hPa (17.3 mm Hg)</i>
· <b>Density at 20 °C (68 °F):</b>	<i>1.12324 g/cm<sup>3</sup> (9.37344 lbs/gal)</i>
· <b>Bulk density:</b> · <b>Relative density</b> · <b>Vapor density</b> · <b>Evaporation rate</b>	<i>1,123 kg/m<sup>3</sup> Not determined. Not determined. Not determined.</i>
· <b>Solubility in / Miscibility with Water:</b>	<i>Fully miscible.</i>
· <b>Partition coefficient (n-octanol/water):</b>	<i>Not determined.</i>
· <b>Viscosity:</b> <b>Dynamic:</b> <b>Kinematic:</b>	<i>Not determined. Not determined.</i>
· <b>Solvent content:</b> <b>Water:</b> <b>VOC content:</b>	<i>93.0 % 0.00 % 0.0 g/l / 0.00 lb/gal</i>
· <b>Solids content:</b> · <b>Other information</b>	<i>1.0 % No further relevant information available.</i>

**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.*

US  
(Contd. on page 8)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 7)

**11 Toxicological information**

· **Information on toxicological effects**

· **Acute toxicity:**

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

**7664-39-3 hydrogen fluoride**

Oral LD50 1,276 mg/kg (rat)

· **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

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:**

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.

Must not reach bodies of water or drainage ditch undiluted or unneutralized.

· **Results of PBT and vPvB assessment**

· **PBT:** Not applicable.

(Contd. on page 9)



**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**



(Contd. of page 8)

- **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** Corrosive liquids, toxic, n.o.s. (Nitric acid, Hydrogen fluoride)
- **ADR** 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE)
- **IMDG, IATA** CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE)
- **Transport hazard class(es)**
- **DOT**
- 
- **Class** 8 Corrosive substances
- **Label** 8, 6.1
- **ADR**
- 
- **Class** 8 (CTI) Corrosive substances

(Contd. on page 10)



**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 9)

· <b>Label</b>	8+6.1
· <b>IMDG</b>	
	
· <b>Class</b>	8 Corrosive substances
· <b>Label</b>	8/6.1
· <b>IATA</b>	
	
· <b>Class</b>	8 Corrosive substances
· <b>Label</b>	8 (6.1)
· <b>Packing group</b>	
· <b>DOT, ADR, IMDG, IATA</b>	III
· <b>Environmental hazards:</b>	Not applicable.
· <b>Special precautions for user</b>	Warning: Corrosive substances
· <b>Hazard identification number (Kemler code):</b>	86
· <b>EMS Number:</b>	F-A,S-B
· <b>Segregation groups</b>	Strong acids
· <b>Stowage Category</b>	B
· <b>Stowage Code</b>	SW2 Clear of living quarters.
· <b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable.
· <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

(Contd. on page 11)

**Safety Data Sheet**  
acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 10)

· **UN "Model Regulation":** 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**  
· **Sara**

· **Section 355 (extremely hazardous substances):**

7697-37-2 nitric acid

7664-39-3 hydrogen fluoride

· **Section 313 (Specific toxic chemical listings):**

7697-37-2 nitric acid

7664-39-3 hydrogen fluoride

· **TSCA (Toxic Substances Control Act):**

All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7664-39-3 hydrogen fluoride

· **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).

(Contd. on page 12)

## Safety Data Sheet

acc. to OSHA HCS

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 11)

**Hazard pictograms**

GHS05 GHS06

**Signal word** *Danger***Hazard-determining components of labeling:***hydrogen fluoride  
nitric acid***Hazard statements***H290 May be corrosive to metals.  
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.  
Wear protective gloves/protective clothing/eye protection/face protection.  
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.*

### 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** *03/23/2020 / -*

(Contd. on page 13)

**Safety Data Sheet**  
*acc. to OSHA HCS*

Printing date 03/23/2020

Reviewed on 03/23/2020

**Trade name: Hafnium**

(Contd. of page 12)

**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*  
*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*  
*BEI: Biological Exposure Limit*  
*Met. Corr. 1: Corrosive to metals – 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*

US