Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

1 Identification

· **Product identifier**

· **Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF**

· **Article number:** 10002-3

· **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 numbers1-800-535-5053
Other emergency telephone numbers 1-352-323-3500

2 Hazard(s) identification

· **Classification of the substance or mixture**

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

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
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.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 1)

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).
Wash contaminated clothing 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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	5.0%
7440-36-0	antimony	0.1%
7664-39-3	Hydrofluoric acid	0.1%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	94.8%

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. Then consult a doctor.*
· **After swallowing:** *Drink copious amounts of water and provide fresh air. Immediately call a doctor.*

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 2)

· **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:** 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.
· **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
7440-36-0	antimony	1.5 mg/m³
7664-39-3	Hydrofluoric acid	1.0 ppm

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7440-36-0	antimony	13 mg/m³
7664-39-3	Hydrofluoric acid	24 ppm

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7440-36-0	antimony	80 mg/m³
7664-39-3	Hydrofluoric acid	44 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 3)

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:**
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit.
At this time, the remaining constituent has no known exposure limits.

7697-37-2 nitric acid	
PEL	Long-term value: 5 mg/m³, 2 ppm
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
7664-39-3 Hydrofluoric acid	
PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin, BEI

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 4)

· **Ingredients with biological limit values:**

7664-39-3 Hydrofluoric acid

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.
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 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

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 5)

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):**	1.02984 g/cm³ (8.59401 lbs/gal)
· **Bulk density:**	1,030 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	94.8 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **Other information**	No further relevant information available.

US

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 6)

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:**		
7440-36-0 antimony		
Oral	LD50	7,000 mg/kg (rat)
7664-39-3 Hydrofluoric acid		
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:
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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 *Reviewed on 08/19/2019*

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 7)

· **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.
· **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

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN3264
· **UN proper shipping name**	
· **DOT**	Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)
· **ADR**	3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
· **Transport hazard class(es)**	
· **DOT**	

· **Class**	8 Corrosive substances
· **Label**	8
· **ADR, IMDG, IATA**	

· **Class**	8 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 8)

· **Label**	8
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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
7664-39-3	Hydrofluoric acid

· **Section 313 (Specific toxic chemical listings):**	
7697-37-2	nitric acid
7440-36-0	antimony
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/19/2019 Reviewed on 08/19/2019

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 9)

· **Hazardous Air Pollutants**

7664-39-3	Hydrofluoric acid

· **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).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
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).
Wash contaminated clothing before reuse.

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Antimony 1000µg/mL in 5% HNO3 + 0.1% HF

(Contd. of page 10)

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** *08/19/2019 / -*
· **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
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
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

1 Identification

· **Product identifier**

· **Trade name: Hafnium 1000 µg/mL in 2% HNO3 + 0.5% HF**

· **Article number:** 100022-3

· **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 numbers1-800-535-5053
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:**
nitric acid
Hydrofluoric acid
· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 1)

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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%
7664-39-3	Hydrofluoric acid	0.5%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	97.4%
7440-58-6	hafnium	0.1%

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 2)

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:** 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.
· **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	Hydrofluoric acid	1.0 ppm
7440-58-6	hafnium	1.5 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 3)

7440-58-6	hafnium	17 mg/m³

· **PAC-3:**

7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
7440-58-6	hafnium	99 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 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

7664-39-3 Hydrofluoric acid

PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin, BEI

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 4)

· **Ingredients with biological limit values:**

7664-39-3 Hydrofluoric acid

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.
· **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

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 5)

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:	100 °C (212 °F)
· **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):**	1.01738 g/cm³ (8.49004 lbs/gal)
· **Bulk density:**	1,017 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **Other information**	No further relevant information available.

US

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 6)

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:**		
7664-39-3 Hydrofluoric acid		
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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 *Reviewed on 08/26/2019*

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

(Contd. of page 7)

· **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.
· **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

· **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 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 Reviewed on 08/26/2019

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

(Contd. of page 8)

· **Label**	8+6.1
· **IMDG**	
	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), III

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

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

(Contd. of page 9)

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	Hydrofluoric acid

· **Section 313 (Specific toxic chemical listings):**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**	
7664-39-3	Hydrofluoric acid

· **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).
· **Hazard pictograms**

GHS05 GHS06

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
Hydrofluoric acid

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

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

(Contd. of page 10)

· **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** 08/26/2019 / -
· **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
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

(Contd. on page 12)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/26/2019 *Reviewed on 08/26/2019*

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

(Contd. of page 11)

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

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

1 Identification

· **Product identifier**

· **Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF**

· **Article number:** 100034-3

· **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 numbers1-800-535-5053
Other emergency telephone numbers 1-352-323-3500

2 Hazard(s) identification

· **Classification of the substance or mixture**

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

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
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.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 1)

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).
Wash contaminated clothing 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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%
7664-39-3	Hydrofluoric acid	0.1%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	97.8%
7439-98-7	molybdenum	0.1%

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. Then consult a doctor.*
· **After swallowing:** *Drink copious amounts of water and provide fresh air. Immediately call a doctor.*

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 2)

· **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:** No special measures required.
· **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.
· **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
7439-98-7	molybdenum	30 mg/m³
7664-39-3	Hydrofluoric acid	1.0 ppm

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7439-98-7	molybdenum	330 mg/m³
7664-39-3	Hydrofluoric acid	24 ppm

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7439-98-7	molybdenum	2,000 mg/m³
7664-39-3	Hydrofluoric acid	44 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 3)

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 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
7664-39-3 Hydrofluoric acid	
PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin, BEI

· **Ingredients with biological limit values:**	
7664-39-3 Hydrofluoric acid	
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)

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 4)

· **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.
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 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.
· **Change in condition**	
Melting point/Melting range:	Undetermined.

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 5)

Boiling point/Boiling range:	100 °C (212 °F)
· **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):**	1.01828 g/cm³ (8.49755 lbs/gal)
· **Bulk density:**	1,018 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.8 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.0 %
· **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.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 6)

11 Toxicological information

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

· **LD/LC50 values that are relevant for classification:**		
7664-39-3 Hydrofluoric acid		
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:
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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 7)

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

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN3264
· **UN proper shipping name**	
· **DOT**	Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)
· **ADR**	3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)
· **Transport hazard class(es)**	
· **DOT**	

· **Class**	8 Corrosive substances
· **Label**	8
· **ADR, IMDG, IATA**	

· **Class**	8 Corrosive substances
· **Label**	8
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 *Reviewed on 08/21/2019*

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 8)

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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
7664-39-3	Hydrofluoric acid

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

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7664-39-3	Hydrofluoric acid

· **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.

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 9)

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**		
None of the ingredients is listed.		

· **TLV (Threshold Limit Value established by ACGIH)**		
7439-98-7	molybdenum	A3

· **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).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
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).
Wash contaminated clothing 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.

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/21/2019 Reviewed on 08/21/2019

Trade name: Molybdenum 1000 µg/mL in 2% HNO3 + 0.1% HF

(Contd. of page 10)

· **Contact:**
High-Purity Standards
Tel: 843-767-7900
Fax: 843-767-7906
· **Date of preparation / last revision** 08/21/2019 / -
· **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
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
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

1 Identification

· **Product identifier**

· **Trade name: Niobium 1000 µg/mL in 2% HNO3 + 0.5% HF**

· **Article number:** 100037-3

· **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 numbers1-800-535-5053
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:**
nitric acid
Hydrofluoric acid
· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 1)

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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%
7664-39-3	Hydrofluoric acid	0.5%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	97.4%
7440-03-1	niobium	0.1%

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 2)

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:** 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.
· **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	Hydrofluoric acid	1.0 ppm
7440-03-1	niobium	30 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 3)

7440-03-1	niobium	330 mg/m³

· **PAC-3:**

7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
7440-03-1	niobium	2,000 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 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

7664-39-3 Hydrofluoric acid

PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin, BEI

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 4)

· **Ingredients with biological limit values:**

7664-39-3 Hydrofluoric acid

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.
· **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

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 5)

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:	100 °C (212 °F)
· **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):**	1.01264 g/cm³ (8.45048 lbs/gal)
· **Bulk density:**	1,013 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **Other information**	No further relevant information available.

US

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 6)

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:**		
7664-39-3 Hydrofluoric acid		
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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 *Reviewed on 08/23/2019*

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

(Contd. of page 7)

· **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.
· **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

· **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 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 8)

· **Label**	8+6.1
· **IMDG**	
	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Strong acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), III

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 Reviewed on 08/23/2019

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

(Contd. of page 9)

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	Hydrofluoric acid

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

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7664-39-3	Hydrofluoric acid

· **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).
· **Hazard pictograms**

GHS05 GHS06

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
Hydrofluoric acid

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

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

(Contd. of page 10)

· **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** 08/23/2019 / -
· **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
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

(Contd. on page 12)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/23/2019 *Reviewed on 08/23/2019*

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

(Contd. of page 11)

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

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

1 Identification

· **Product identifier**

· **Trade name: Tantalum**

· **Article number:** 100055-3

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
High-Purity Standards
Address PO Box 41727 Charleston, SC 29423 United States
Telephone +1-843-767-7900
Fax +1-843-767-7906
Website highpuritystandards.com
Email info@highpuritystandards.com

· **Information department:** Product safety department
· **Emergency telephone number:**
INFOTRAC
Emergency telephone numbers1-800-535-5053
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:**
nitric acid
Hydrofluoric acid
· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

Trade name: Tantalum

(Contd. of page 1)

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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%

· **Chemical identification of the substance/preparation**		
7664-39-3	Hydrofluoric acid	0.5%
7440-25-7	tantalum	0.1%
7732-18-5	water, distilled, conductivity or of similar purity	97.4%

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

Trade name: Tantalum

(Contd. of page 2)

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:** 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.
· **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	Hydrofluoric acid	1.0 ppm
7440-25-7	tantalum	10 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

Trade name: Tantalum

(Contd. of page 3)

7440-25-7	tantalum	11 mg/m³

· **PAC-3:**

7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
7440-25-7	tantalum	64 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 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**
· **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.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 *Reviewed on 07/02/2019*

Trade name: Tantalum

(Contd. of page 4)

· **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.*
· **Change in condition**	
Melting point/Melting range:	*Undetermined.*
Boiling point/Boiling range:	*100 °C (212 °F)*
· **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.*

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 5)

· **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
· **Density at 20 °C (68 °F):**	1.02067 g/cm³ (8.51749 lbs/gal)
· **Bulk density:**	1,021 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 %
	0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **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:**		
7664-39-3 Hydrofluoric acid		
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.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

Trade name: Tantalum

(Contd. of page 6)

· **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.
· **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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 *Reviewed on 07/02/2019*

Trade name: Tantalum

(Contd. of page 7)

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 liquids, 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 Corrosive substances
· **Label**	8+6.1
· **IMDG**	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Tantalum

(Contd. of page 8)

· **Segregation groups**	Acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUIDS, 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	Hydrofluoric acid

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

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

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

All ingredients are 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.

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 07/02/2019 Reviewed on 07/02/2019

Trade name: Tantalum

(Contd. of page 9)

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency) (Substances not listed)**

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid
7440-25-7	tantalum
7732-18-5	water, distilled, conductivity or of similar purity

· **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).
· **Hazard pictograms**

GHS05 GHS06

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
Hydrofluoric 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.

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Tantalum

(Contd. of page 10)

· **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** 07/02/2019 / -
· **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
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
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

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

1 Identification

· **Product identifier**

· **Trade name: Tellurium 1000µg/mL in 2% HNO3 + 0.5% HF**

· **Article number:** 100056-3

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
High-Purity Standards
P.O. Box 41727
Charleston, SC 29423
Telephone: (843) 767-7900
FAX: (843) 767-7906

· **Information department:** Product safety department
· **Emergency telephone number:**
INFOTRAC
Emergency telephone numbers1-800-535-5053
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.

GHS08 Health hazard

Repr. 1A H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.

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 GHS08

· **Signal word** Danger

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

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 1)

Hydrofluoric acid
tellurium

· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.

· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep only in original container.
Do not breathe dusts or mists.
Avoid contact during pregnancy/while nursing.
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: 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.
IF exposed or concerned: Get medical advice/attention.
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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 2)

· **Dangerous components:**		
7697-37-2	nitric acid	2.0%
13494-80-9	tellurium	0.1%

· **Chemical identification of the substance/preparation**		
7664-39-3	Hydrofluoric acid	0.5%
7732-18-5	water, distilled, conductivity or of similar purity	97.4%

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:** 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.
· **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 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 3)

· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
7697-37-2	nitric acid	0.16 ppm
7664-39-3	Hydrofluoric acid	1.0 ppm
13494-80-9	tellurium	1.8 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm
13494-80-9	tellurium	20 mg/m³

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
13494-80-9	tellurium	110 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
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 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

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 4)

13494-80-9 tellurium	
PEL	Long-term value: 0.1 mg/m³ as Te
REL	Long-term value: 0.1 mg/m³ as Te
TLV	Long-term value: 0.1 mg/m³ as Te

· **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 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

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 5)

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:	100 °C (212 °F)
· **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):**	1.01032 g/cm³ (8.43112 lbs/gal)
· **Bulk density:**	1,010 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **Other information**	No further relevant information available.

US

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

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

(Contd. of page 6)

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:**		
7664-39-3 Hydrofluoric acid		
Oral	LD50	1,276 mg/kg (rat)
13494-80-9 tellurium		
Oral	LD50	83 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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 *Reviewed on 11/20/2018*

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

(Contd. of page 7)

· **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.
· **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

· **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 liquids, 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 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 8)

· **Label**	8+6.1
· **IMDG**	
	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUIDS, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), III

US

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 9)

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	Hydrofluoric acid
13494-80-9	tellurium

· **Section 313 (Specific toxic chemical listings):**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All ingredients are 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) (Substances not listed)**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid
13494-80-9	tellurium
7732-18-5	water, distilled, conductivity or of similar purity

· **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).
· **Hazard pictograms**

GHS05 GHS06 GHS08

· **Signal word** Danger

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 Reviewed on 11/20/2018

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

(Contd. of page 10)

· **Hazard-determining components of labeling:**
nitric acid
Hydrofluoric acid
tellurium
· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.
· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep only in original container.
Do not breathe dusts or mists.
Avoid contact during pregnancy/while nursing.
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: 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.
IF exposed or concerned: Get medical advice/attention.
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** 11/20/2018 / -
· **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

(Contd. on page 12)

Safety Data Sheet
acc. to OSHA HCS

Printing date 11/20/2018 *Reviewed on 11/20/2018*

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

(Contd. of page 11)

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
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
Repr. 1A: Reproductive toxicity – Category 1A

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

1 Identification

· **Product identifier**

· **Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)**

· **Article number:** 100061-3

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
High-Purity Standards
P.O. Box 41727
Charleston, SC 29423
Telephone: (843) 767-7900
FAX: (843) 767-7906

· **Information department:** Product safety department
· **Emergency telephone number:**
INFOTRAC
Emergency telephone numbers1-800-535-5053
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:**
nitric acid
Hydrofluoric acid
· **Hazard statements**
H290 May be corrosive to metals.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 1)

· **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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%

· **Chemical identification of the substance/preparation**		
7664-39-3	Hydrofluoric acid	0.5%
7440-31-5	tin	0.1%
7732-18-5	water, distilled, conductivity or of similar purity	97.4%

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 2)

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:** 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.
· **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	Hydrofluoric acid	1.0 ppm
7440-31-5	tin	6 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 3)

7440-31-5	tin	67 mg/m³

· **PAC-3:**

7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
7440-31-5	tin	400 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 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**
· **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.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 4)

· **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.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	100 °C (212 °F)
· **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.

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 5)

· **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
· **Density at 20 °C (68 °F):**	1.00757 g/cm³ (8.40817 lbs/gal)
· **Bulk density:**	1,008 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 %
	0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **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:**		
7664-39-3 Hydrofluoric acid		
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.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 6)

· **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.
· **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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 *Reviewed on 03/15/2019*

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 7)

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 liquids, 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 Corrosive substances
· **Label**	8+6.1
· **IMDG**	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 8)

· **Segregation groups**	Acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUIDS, 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	Hydrofluoric acid

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

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All ingredients are 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.

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/15/2019 Reviewed on 03/15/2019

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 9)

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency) (Substances not listed)**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid
7440-31-5	tin
7732-18-5	water, distilled, conductivity or of similar purity

· **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).
· **Hazard pictograms**

GHS05 GHS06

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
Hydrofluoric 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.

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Tin (1000µg/mL in 2% HNO3 + 0.5% HF)

(Contd. of page 10)

· **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** 03/15/2019 / -
· **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
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
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

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

1 Identification

· **Product identifier**

· **Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)**

· **Article number:** 100062-3

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
High-Purity Standards
Address PO Box 41727 Charleston, SC 29423 United States
Telephone +1-843-767-7900
Fax +1-843-767-7906
Website highpuritystandards.com
Email info@highpuritystandards.com

· **Information department:** Product safety department
· **Emergency telephone number:**
INFOTRAC
Emergency telephone numbers1-800-535-5053
Other emergency telephone numbers 1-352-323-3500

2 Hazard(s) identification

· **Classification of the substance or mixture**

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

· **Signal word** Danger

· **Hazard-determining components of labeling:**
nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
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.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 1)

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).
Wash contaminated clothing 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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%

· **Chemical identification of the substance/preparation**		
7664-39-3	Hydrofluoric acid	0.1%
7440-32-6	titanium	0.1%
7732-18-5	water, distilled, conductivity or of similar purity	97.8%

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. Then consult a doctor.
· **After swallowing:** Drink copious amounts of water and provide fresh air. Immediately call a doctor.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 2)

· **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:** No special measures required.
· **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.
· **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	Hydrofluoric acid	1.0 ppm
7440-32-6	titanium	30 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm
7440-32-6	titanium	330 mg/m³

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm
7440-32-6	titanium	2,000 mg/m³

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 3)

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 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**
· **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.
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

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 4)

· **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.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	100 °C (212 °F)
· **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):**	1.01257 g/cm³ (8.4499 lbs/gal)
· **Bulk density:**	~1,009 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 5)

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

· **Viscosity:**
Dynamic: Not determined.
Kinematic: Not determined.

· **Solvent content:**
Water: 97.8 %
VOC content: 0.00 %
0.0 g/l / 0.00 lb/gal

Solids content: 0.1 %
· **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:**		
7664-39-3 Hydrofluoric acid		
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:
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.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 6)

· **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:**
Generally 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.

14 Transport information

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN3264
· **UN proper shipping name**	
· **DOT**	Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid, Hydrogen fluoride)
· **ADR**	3264 Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid, Hydrogen fluoride)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE)

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 7)

· **Transport hazard class(es)**

· **DOT**

· **Class**	8 Corrosive substances
· **Label**	8

· **ADR, IMDG, IATA**

· **Class**	8 Corrosive substances
· **Label**	8
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	A
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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, HYDROGEN FLUORIDE), 8, III

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 8)

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	Hydrofluoric acid

· **Section 313 (Specific toxic chemical listings):**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All ingredients are 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) (Substances not listed)**	
7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid
7440-32-6	titanium
7732-18-5	water, distilled, conductivity or of similar purity

· **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).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

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

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 Reviewed on 06/26/2019

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 9)

· **Hazard statements**
H290 May be corrosive to metals.
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).
Wash contaminated clothing 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** 06/26/2019 / -
· **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
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
Met. Corr.1: Corrosive to metals – Category 1

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 06/26/2019 *Reviewed on 06/26/2019*

Trade name: 100062-3 Titanium (1000 µg/mL in 2% HNO3 + 0.1% HF)

(Contd. of page 10)

Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

1 Identification

· **Product identifier**

· **Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)**

· **Article number:** 100063-3

· **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

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:**
Hydrofluoric acid
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.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 1)

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)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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	2.0%
7664-39-3	Hydrofluoric acid	1.0%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	96.9%
7440-33-7	tungsten	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.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 2)

· **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:** 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.
· **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	Hydrofluoric acid	1.0 ppm
7440-33-7	tungsten	10 mg/m³

· **PAC-2:**		
7697-37-2	nitric acid	24 ppm
7664-39-3	Hydrofluoric acid	24 ppm
7440-33-7	tungsten	330 mg/m³

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7664-39-3	Hydrofluoric acid	44 ppm

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 3)

7440-33-7	tungsten	2,000 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 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
7664-39-3 Hydrofluoric acid	
PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin, BEI

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 4)

· **Ingredients with biological limit values:**

7664-39-3 Hydrofluoric acid	
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.
· **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

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 5)

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:	100 °C (212 °F)
· **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):**	1.01834 g/cm³ (8.49805 lbs/gal)
· **Bulk density:**	1,003 kg/m³
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Water:	96.9 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **Other information**	No further relevant information available.

US

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 6)

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:**		
7664-39-3 Hydrofluoric acid		
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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 7)

· **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.
· **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

· **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 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 8)

· **Label**	8+6.1
· **IMDG**	
	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Strong acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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
· **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 2922 CORROSIVE LIQUID, TOXIC, N.O.S. (NITRIC ACID, HYDROGEN FLUORIDE), 8 (6.1), III

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 9)

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	Hydrofluoric acid

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

7697-37-2	nitric acid
7664-39-3	Hydrofluoric acid

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**

7664-39-3	Hydrofluoric acid

· **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).
· **Hazard pictograms**

GHS05 GHS06

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Hydrofluoric acid
nitric acid

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 Reviewed on 09/10/2019

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 10)

· **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** 09/10/2019 / -
· **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
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

(Contd. on page 12)

Safety Data Sheet
acc. to OSHA HCS

Printing date 09/10/2019 *Reviewed on 09/10/2019*

Trade name: 100063-3 Tungsten (1000µg/mL in 2%HNO3 + 1% HF)

(Contd. of page 11)

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

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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 numbers1-800-535-5053
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)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 1)

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

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 3
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.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 2)

· **Dangerous components:**		
7697-37-2	nitric acid	2.0%
7664-39-3	hydrofluoric acid	0.5%

· **Chemical identification of the substance/preparation**		
7732-18-5	water, distilled, conductivity or of similar purity	97.4%
7440-67-7	zirconium	0.1%

4 First-aid measures

· **Description of 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.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(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
7440-67-7	zirconium	10 mg/m³

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

· **PAC-3:**		
7697-37-2	nitric acid	92 ppm
7440-67-7	zirconium	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 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

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 4)

7664-39-3 hydrofluoric acid	
PEL	Long-term value: 3 ppm as F
REL	Long-term value: 2.5 mg/m³, 3 ppm Ceiling limit value: 5* mg/m³, 6* ppm *15-min, as F
TLV	Long-term value: 0.41 mg/m³, 0.5 ppm Ceiling limit value: 1.64 mg/m³, 2 ppm as F; Skin; BEI

· **Ingredients with biological limit values:**

7664-39-3 hydrofluoric acid	
BEI	3 mg/g creatinine Medium: urine Time: prior to shift Parameter: Flourides (background) 10 mg/g creatinine Medium: urine Time: end of shift Parameter: Flourides (background)

· **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 can not be calculated in advance and has therefore to be checked prior to the application.

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 5)

· **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.
· **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.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 6)

Kinematic:	Not determined.
· **Solvent content:**	
Water:	97.4 %
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	0.1 %
· **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:**
· **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.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 7)

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**	Corrosive liquids, toxic, n.o.s. (Hydrofluoric acid, Nitric acid)
· **ADR**	2922 CORROSIVE LIQUID, TOXIC, N.O.S. (HYDROFLUORIC ACID, NITRIC ACID)
· **IMDG, IATA**	CORROSIVE LIQUID, TOXIC, N.O.S. (HYDROFLUORIC ACID, NITRIC ACID)
· **Transport hazard class(es)**	
· **DOT**	

· **Class**	8 Corrosive substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 *Reviewed on 08/27/2019*

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

(Contd. of page 8)

· **Label**	8, 6.1
· **ADR**	
	
· **Class**	8 Corrosive substances
· **Label**	8+6.1
· **IMDG**	
	
· **Class**	8 Corrosive substances
· **Label**	8/6.1
· **IATA**	
	
· **Class**	8 Corrosive substances
· **Label**	8 (6.1)
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	86
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Strong acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **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

(Contd. on page 10)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 9)

· **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 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).

(Contd. on page 11)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 Reviewed on 08/27/2019

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

(Contd. of page 10)

· **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.

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)

Safety Data Sheet
acc. to OSHA HCS

Printing date 08/27/2019 *Reviewed on 08/27/2019*

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

(Contd. of page 11)

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
Met. Corr.1: Corrosive to metals – Category 1
Acute Tox. 4: Acute toxicity – Category 4
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