<table>
<thead>
<tr>
<th>1 Identification</th>
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</thead>
<tbody>
<tr>
<td><strong>Product identifier</strong></td>
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<tr>
<td><strong>Product name:</strong> Niobium Standard: 1000 µg/mL Nb in 2% HF [100ml bottle]</td>
</tr>
<tr>
<td><strong>Part number:</strong> 5190-8493</td>
</tr>
<tr>
<td><strong>Application of the substance / the mixture</strong> Reference material for laboratory use only</td>
</tr>
</tbody>
</table>
| **Manufacturer/Supplier:** Agilent Technologies, Inc.  
5301 Stevens Creek Blvd.  
Santa Clara, CA 95051 USA  
Tel: 800-227-9770 |
| **Information department:** e-mail: pdl-msds_author@agilent.com  
**Emergency telephone number:** CHEMTREC®: 1-800-424-9300 |

<table>
<thead>
<tr>
<th>2 Hazard(s) identification</th>
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<tbody>
<tr>
<td><strong>Classification of the substance or mixture</strong></td>
</tr>
</tbody>
</table>
| GHS06 Skull and crossbones  
Acute Tox. 3  H311 Toxic in contact with skin. |
| GHS05 Corrosion  
Skin Corr. 1B  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 |
| **Hazard-determining components of labeling:** |
| Hydrofluoric acid - |
| **Hazard statements** |
| H302 Harmful if swallowed.  
H311 Toxic in contact with skin.  
H314 Causes severe skin burns and eye damage. |
| **Precautionary statements** |
| P260  Do not breathe dusts or mists.  
P280  Wear protective gloves / protective clothing.  
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. |

(Contd. on page 2)
Product name: Niobium Standard: 1000 µg/mL Nb in 2% HF [100ml bottle]

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a poison center/doctor.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- Classification system:
  - NFPA ratings (scale 0 - 4)
    
    Health = 3  
    Fire = 0  
    Reactivity = 0
  - HMIS-ratings (scale 0 - 4)
    
    HEALTH  
    Health = 3  
    FIRE  
    Fire = 0  
    REACTIVITY  
    Reactivity = 0

- Other hazards
  - Results of PBT and vPvB assessment
    
    PBT: Not applicable.
    vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Mixtures
  - Description:
    Aqueous solution.
    Also contains substances at levels not considered to be hazardous.

- Dangerous components:

| CAS: 7664-39-3 | Hydrofluoric acid - | Acute Tox. 2, H300; Acute Tox. 1, H310; Acute Tox. 2, H330; Skin Corr. 1A, H314 | < 2.0% |

4 First-aid measures

- Description of first aid measures
  - General information:
    Immediately remove any clothing soiled by the product.
    In case of irregular breathing or respiratory arrest provide artificial respiration.
  - After inhalation: In case of unconsciousness place patient stably in side position for transportation.
  - After skin contact: 
    Immediately wash with water and soap and rinse thoroughly.
    If skin irritation continues, consult a doctor.
  - After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
  - After swallowing: Rinse mouth. Do not induce vomiting.
  - 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:
    - CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Special hazards arising from the substance or mixture**
  - Formation of toxic gases is possible during heating or in case of fire.
- **Advice for firefighters**
  - **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

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

7 Handling and storage

- **Handling:**
  - **Precautions for safe handling**
    - Ensure good ventilation/exhaustion at the workplace.
    - Store in cool, dry place in tightly closed receptacles.
    - Prevent formation of aerosols.
  - **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
  - **Requirements to be met by storerooms and receptacles:**
    - Store in a cool location.
    - Please refer to the manufacturers certificate for specific storage and transport temperature conditions.
    - Store only in the original receptacle.
    - Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
  - **Information about storage in one common storage facility:** Store away from foodstuffs.
  - **Further information about storage conditions:** None.
  - **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:

**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)

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 skin.
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:

Chemical-resistant, impervious gloves with an approved standards should be worn at all times.
The selection of the glove material is based on the penetration times, rates of diffusion and its degradation

Protective gloves

Material of gloves

PVC gloves
Neoprene gloves

Penetration time of glove material

The protection time of the gloves can not be accurately estimated for mixtures consisting of several substances.
Refer to and observe manufacturers break through times of the protective gloves.
9 Physical and chemical properties

- Information on basic physical and chemical properties
  - General Information
  - Appearance:
    - Form: Liquid
    - Color: Colorless
    - Odor: Odorless
    - Odor threshold: Not determined.
  - pH-value at 20 °C (68 °F): < 4
  - Change in condition
    - Melting point/Melting range: Not determined.
    - Boiling point/Boiling range: 100 °C (212 °F)
  - Flash point: Not applicable.
  - Flammability (solid, gaseous): Not determined.
  - Ignition temperature:
    - Decomposition temperature: Not determined.
  - Auto igniting: Product is not selfigniting.
  - Danger of explosion: Not determined.
  - Explosion limits:
    - Lower: Not determined.
    - Upper: Not determined.
  - Vapor pressure at 20 °C (68 °F): 23 hPa (17 mm Hg)
  - Density at 20 °C (68 °F): 0.98002 g/cm³ (8.178 lbs/gal)
  - Relative density Not determined.
  - Vapour 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.
    - Kinematic: Not determined.
  - Other information No further relevant information available.

10 Stability and reactivity

- Reactivity Stable under normal conditions.
- Chemical stability Stable under normal conditions.
### 40.0.7

- **Thermal decomposition / conditions to be avoided:**
  Formation of toxic gases is possible during heating or in case of fire.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** Heat.
- **Incompatible materials:** Strong oxidizing agents.
- **Hazardous decomposition products:** Formation of toxic gases is possible during heating or in case of fire.

### 11 Toxicological information

- **Information on toxicological effects**
  - **Acute toxicity:**
    - **LD/LC50 values that are relevant for classification:**
      - 7664-39-3 Hydrofluoric acid -
        - Oral LD50 1276 mg/kg (rat)
  - **Primary irritant effect:**
    - **on the skin:** Irritant to skin and mucous membranes.
    - **on the eye:** 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
      - Irritant

### 11 Carcinogenic categories

- **IARC (International Agency for Research on Cancer)**
  - None of the ingredients is listed.
- **NTP (National Toxicology Program)**
  - None of the ingredients is listed.
- **OSHA-Ca (Occupational Safety & Health Administration)**
  - None of the ingredients is listed.

### 12 Ecological information

- **Toxicity**
  - **Aquatic toxicity:** No further relevant information available.
  - **Persistence and degradability** No further relevant information available.
  - **Behavior in environmental systems:**
    - **Bioaccumulative potential** No further relevant information available.
    - **Mobility in soil** No further relevant information available.
  - **Additional ecological information:**
    - **General notes:**
      - Water hazard class 1 (Self-assessment): slightly hazardous for water
      - Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
    - **Results of PBT and vPvB assessment**
      - **PBT:** Not applicable.
      - **vPvB:** Not applicable.
    - **Other adverse effects** No further relevant information available.
13 Disposal considerations

· Waste treatment methods
  · Recommendation:
    Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· Uncleaned packagings:
  · Recommendation: Dispose in accordance with national regulations.
  · Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

· UN-Number
  UN2922

· DOT, ADR, IMDG, IATA
  DOT: Corrosive liquids, toxic, n.o.s. (Hydrofluoric acid)
  ADR: 2922 Corrosive liquids, toxic, n.o.s. (Hydrofluoric acid)
  IMDG, IATA: CORROSIVE LIQUID, TOXIC, N.O.S. (HYDROFLUORIC ACID)

· 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)
Product name: Niobium Standard: 1000 µg/mL Nb in 2% HF [100ml bottle]

- Packing group
  - DOT, ADR, IMDG, IATA: III
- Environmental hazards:
  - Marine pollutant: No
- Special precautions for user
  - Warning: Corrosive substances
  - Danger code (Kemler): 86
  - EMS Number: F-A,S-B
  - Segregation groups: Acids
- Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.
- UN "Model Regulation": UN2922, Corrosive liquids, toxic, n.o.s. (Hydrofluoric 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):
      - 7664-39-3 Hydrofluoric acid -
    - Section 313 (Specific toxic chemical listings):
      - 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)
    - 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).
Product name: Niobium Standard: 1000 µg/mL Nb in 2% HF [100ml bottle]

- Hazard pictograms
  
  GHS05  GHS06

- Signal word Danger

- Hazard-determining components of labeling:
  Hydrofluoric acid

- Hazard statements
  H302 Harmful if swallowed.
  H311 Toxic in contact with skin.
  H314 Causes severe skin burns and eye damage.

- Precautionary statements
  P260 Do not breathe dusts or mists.
  P280 Wear protective gloves / protective clothing.
  P303+P361+P351 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
  P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  P310 Immediately call a poison center/doctor.
  P405 Store locked up.
  P501 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

The information contained in this document is based on Agilent’s state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

- Date of preparation / last revision: 06/15/2015

- 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)
  LC50: Lethal concentration, 50 percent
  LD50: Lethal dose, 50 percent
  Acute Tox. 2: Acute toxicity, Hazard Category 2
  Acute Tox. 4: Acute toxicity, Hazard Category 4
  Acute Tox. 1: Acute toxicity, Hazard Category 1
  Acute Tox. 3: Acute toxicity, Hazard Category 3
  Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A
  Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
  Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1

- Sources