

# SAFETY DATA SHEET

Date Printed: 04/19/2024

Date Revised: 01/15/2022

## SECTION 1. IDENTIFICATION

**Product Identifier:** (3N) 99.9% Hafnium(IV) n-butoxide

**Product Code:** HF4-NBBOX-03

**CAS Number:** 22411-22-9

**Relevant identified uses of the substance:** Scientific research and development

Supplier details:

American Elements  
10884 Weyburn Ave.  
Los Angeles, CA 90024  
Tel: +1 310-208-0551  
Fax: +1 310-208-0351  
Emergency telephone number:  
+1 800-424-9300

## SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids(Category 3), H226

Serious eye damage(Category 1), H318

Skin sensitisation(Category 1), H317

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H226

Flammable liquid and vapor.

H317

May cause an allergic skin reaction.

H318

Causes serious eye damage.

Precautionary statement(s)

P210

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233

Keep container tightly closed.

P240

Ground/bond container and receiving equipment.

P241

Use explosion-proof electrical/ ventilating/ lighting/ equipment.

P242

Use only non-sparking tools.

P243

Take precautionary measures against static discharge.

P261

Avoid breathing dust/ fume/ gas/ mist/ Vapors/ spray.

P272

Contaminated work clothing should not be allowed out of the workplace.

P280

Wear protective gloves/ protective clothing/ eye protection/ face protection.

P303 + P361 + P353

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.

P321

Specific treatment (see supplemental first aid instructions on this label).

P333 + P313

If skin irritation or rash occurs: Get medical advice/ attention.

P363

Wash contaminated clothing before reuse.

P370 + P378

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

P403 + P235

Store in a well-ventilated place. Keep cool.

P501

Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS-none

---

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures

Synonyms: Tetrabutoxyhafnium(IV)

n-Butoxy hafnium

Formula: C<sub>16</sub>H<sub>36</sub>HfO<sub>4</sub>

Molecular weight: 470.94 g/mol

---

## SECTION 4. FIRST AID MEASURES

Description of first aid measures

#### General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

Move out of dangerous area.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

#### If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11

Indication of any immediate medical attention and special treatment needed

No data available

---

## SECTION 5. FIREFIGHTING MEASURES

#### Extinguishing media

##### Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

#### Special hazards arising from the substance or mixture

No data available

#### Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

#### Further information

Use water spray to cool unopened containers.

---

## SECTION 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing Vapors, mist or gas. Ensure adequate ventilation.

Remove all sources of ignition. Evacuate personnel to safe areas. Beware of Vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

For personal protection see section 8.

#### Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

#### Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

#### Reference to other sections

For disposal see section 13.

---

## SECTION 7. HANDLING AND STORAGE

#### Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of Vapor or mist.

Keep away from sources of ignition -No smoking. Take measures to prevent the build up of electrostatic charge.  
For precautions see section 2.  
Conditions for safe storage, including any incompatibilities  
Keep container tightly closed in a dry and well-ventilated place.  
Containers which are opened must be carefully resealed and kept upright to prevent leakage.  
Moisture sensitive.  
Handle and store under inert gas.  
Specific end use(s)  
Apart from the uses mentioned in section 1 no other specific uses are stipulated

---

## **SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.

Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

---

## **SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Information on basic physical and chemical properties

Appearance

Form: liquid

Colour: colourless

Odor

No data available

Odor Threshold

No data available

pH

No data available  
Melting point/freezing point  
No data available  
Initial boiling point and boiling range  
No data available  
Flash point  
35 °C (95 °F)  
Evaporation rate  
No data available  
Flammability (solid, gas)  
No data available  
Upper/lower flammability or explosive limits  
No data available  
Vapor pressure  
No data available  
Vapor density  
No data available  
Relative density  
1.2376 g/mL  
Water solubility  
No data available  
Partition coefficient: n-octanol/water  
No data available  
Auto-ignition temperature  
The substance or mixture is not classified as self heating.  
Decomposition temperature  
No data available  
Viscosity  
No data available  
Explosive properties  
No data available  
Oxidizing properties  
No data available  
Other safety information  
No data available

---

## **SECTION 10. STABILITY AND REACTIVITY**

Reactivity  
No data available  
Chemical stability  
Stable under recommended storage conditions.  
Possibility of hazardous reactions  
Vapors may form explosive mixture with air.  
Conditions to avoid  
Heat, flames and sparks.  
Incompatible materials  
Alcohols, Ketones, Strong oxidizing agents  
Hazardous decomposition products  
Hazardous decomposition products formed under fire conditions.  
-Carbon oxides, Zirconium oxides, Hafnium oxide  
Other decomposition products  
-No data available

In the event of fire: see section 5

---

## **SECTION 11. TOXICOLOGICAL INFORMATION**

Information on toxicological effects

Acute toxicity

No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Germ cell mutagenicity

No data available

Carcinogenicity

IARC:

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP:

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA:

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity -single exposure

No data available

Specific target organ toxicity -repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

---

## **SECTION 12. ECOLOGICAL INFORMATION**

Toxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

Other adverse effects

No data available

---

## **SECTION 13. DISPOSAL CONSIDERATIONS**

Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable.

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

---

## **SECTION 14. TRANSPORT INFORMATION**

DOT (US)

UN number:1993

Class: 3

Packing group: III

Proper shipping name: Flammable liquids, n.o.s.(Hafnium(IV) n-butoxide)

Reportable Quantity(RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1993

Class: 3

Packing group: III

EMS-No: F-E, S-E

Proper shipping name: FLAMMABLE LIQUID, N.O.S.(Hafnium(IV) n-butoxide)

IATA

UN number:1993

Class: 3

Packing group: III

Proper shipping name: Flammable liquid, n.o.s.(Hafnium(IV) n-butoxide)

---

## **SECTION 15. REGULATORY INFORMATION**

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Hafnium(IV) n-butoxide

CAS-No.  
22411-22-9  
Revision Date  
Zirconium  
7440-67-7  
1991-07-01  
New Jersey Right To Know Components

Hafnium(IV) n-butoxide

CAS-No.  
22411-22-9  
Revision Date  
Zirconium  
7440-67-7  
1991-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

---

## 16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2022 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.