

# SAFETY DATA SHEET

Date Printed: 05/16/2024

Date Revised: 01/15/2022

## SECTION 1. IDENTIFICATION

**Product Identifier:** (5N) 99.999% Ultra Thin Ytterbium Nanoscale Foil

**Product Code:** YB-M-05-FN

**CAS Number:** 7440-64-4

**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 in accordance with 29 CFR 1910 (OSHA HCS)

GHS02 Flame

Flam. Sol. 1 H228 Flammable solid.

Water-react. 1 H260 In contact with water releases flammable gases which may ignite spontaneously.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02

Signal word Danger

Hazard statements

H228 Flammable solid.

H260 In contact with water releases flammable gases which may ignite spontaneously.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P231+P232 Handle under inert gas. Protect from moisture.

P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ventilating/lighting/equipment.  
P233 Keep container tightly closed.  
P370+P378 In case of fire: Use for extinction: Special powder for metal fires.  
P335+P334 Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.  
P402+P404 Store in a dry place. Store in a closed container.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.  
WHMIS classification  
B4 - Flammable solid  
B6 - Reactive flammable material  
Classification system  
HMIS ratings (scale 0-4)  
(Hazardous Materials Identification System)  
Health (acute effects) = 1  
Flammability = 3  
Physical Hazard = 2  
Other hazards  
Results of PBT and vPvB assessment  
PBT: Not applicable.  
vPvB: Not applicable.

---

### **SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical characterization: Substances  
CAS# Description:  
7440-64-4 Ytterbium  
Identification number(s):  
EC number: 231-173-2

---

### **SECTION 4. FIRST AID MEASURES**

Description of first aid measures  
After inhalation  
Supply fresh air. If required, provide artificial respiration. Keep patient warm.  
Seek immediate medical advice.  
After skin contact  
Immediately wash with water and soap and rinse thoroughly.  
Seek immediate medical advice.  
After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.  
After swallowing Seek medical treatment.  
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.

---

## **SECTION 5. FIREFIGHTING MEASURES**

Extinguishing media

Suitable extinguishing agents Special powder for metal fires. Do not use water.

For safety reasons unsuitable extinguishing agents Water

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Ytterbium oxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

---

## **SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

Environmental precautions: Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up:

Ensure adequate ventilation.

Do not flush with water or aqueous cleansing agents

Prevention of secondary hazards: Keep away from ignition sources.

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.

---

## **SECTION 7. HANDLING AND STORAGE**

Handling

Precautions for safe handling

Handle under dry protective gas.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: Protect against electrostatic charges.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: Store in a cool location.

Information about storage in one common storage facility:

Store away from air.

Store away from water/moisture.

Do not store together with acids.

Store away from oxidizing agents.

Store away from halogens.

Store away from acid chlorides.

Further information about storage conditions:

Store under dry inert gas.

This product is moisture sensitive.

This product is air sensitive.

Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.  
Protect from humidity and water.  
Specific end use(s) No further relevant information available.

---

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

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Recommended filter device for short term use:

Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls.

Risk assessment should be performed to determine if airpurifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves Nitrile rubber, NBR

Penetration time of glove material (in minutes) 480

Glove thickness 0.11 mm

Eye protection:

Safety glasses

Full face protection

Body protection: Protective work clothing.

---

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

Information on basic physical and chemical properties

General Information

Appearance:

Form: Powder

Odor: Odorless

Odor threshold: Not determined.

pH-value: Not applicable.

Change in condition  
Melting point/Melting range: 819 °C (1506 °F)  
Boiling point/Boiling range: 1196 °C (2185 °F)  
Sublimation temperature / start: Not determined  
Flammability (solid, gaseous) Highly flammable.  
Contact with water liberates extremely flammable gases.  
Ignition temperature: Not determined  
Decomposition temperature: Not determined  
Auto igniting: Not determined.  
Danger of explosion: Not determined.  
Explosion limits:  
Lower: Not determined  
Upper: Not determined  
Vapor pressure: Not applicable.  
Density at 20 °C (68 °F): 6.97 g/cm<sup>3</sup> (58.165 lbs/gal)  
Relative density Not determined.  
Vapor density Not applicable.  
Evaporation rate Not applicable.  
Solubility in / Miscibility with  
Water: Contact with water releases flammable gases  
Partition coefficient (n-octanol/water): Not determined.  
Viscosity:  
dynamic: Not applicable.  
kinematic: Not applicable.  
Other information No further relevant information available.

---

## SECTION 10. STABILITY AND REACTIVITY

Reactivity In contact with water releases flammable gases which may ignite spontaneously.  
Chemical stability Stable under recommended storage conditions.  
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.  
Possibility of hazardous reactions  
Reacts with strong oxidizing agents  
Contact with water releases flammable gases  
Conditions to avoid No further relevant information available.  
Incompatible materials:  
Acids  
Air  
Oxidizing agents  
Halogens  
Acid chlorides  
Water/moisture  
Hazardous decomposition products: Ytterbium oxide

---

## SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects  
Acute toxicity: No effects known.  
LD/LC50 values that are relevant for classification: No data  
Skin irritation or corrosion: May cause irritation

Eye irritation or corrosion: May cause irritation

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: No effects known.

Carcinogenicity:

The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this substance.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: No effects known.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Carcinogenic categories

OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

---

## SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Aquatic toxicity: No further relevant information available.

Persistence and degradability No further relevant information available.

Bioaccumulative potential No further relevant information available.

Mobility in soil No further relevant information available.

Additional ecological information:

General notes: Avoid transfer into the environment.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects No further relevant information available.

---

## SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

---

## SECTION 14. TRANSPORT INFORMATION

UN-Number

DOT, IMDG, IATA UN3089

UN proper shipping name

DOT Metal powders, flammable, n.o.s. (Ytterbium powder)

IMDG, IATA METAL POWDER, FLAMMABLE, N.O.S. (Ytterbium powder)

Transport hazard class(es)

DOT

Class 4.1 Flammable solids, self-reactive substances and solid desensitised explosives.

Label 4.1

Class 4.1 (F3) Flammable solids, self-reactive substances and solid desensitised explosives  
Label 4.1  
IMDG, IATA  
Class 4.1 Flammable solids, self-reactive substances and solid desensitised explosives.  
Label 4.1  
Packing group  
DOT, IMDG, IATA II  
Environmental hazards: Not applicable.  
Special precautions for user Warning: Flammable solids, self-reactive substances and solid desensitised explosives  
EMS Number: F-G,S-G  
Segregation groups Heavy metals and their salts (including their organometallic compounds), powdered metals  
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.  
Transport/Additional information:  
DOT  
Marine Pollutant (DOT): No  
UN "Model Regulation": UN3089, Metal powders, flammable, n.o.s. (Ytterbium powder), 4.1, II

---

## SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture  
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)  
Hazard pictograms  
GHS02  
Signal word Danger  
Hazard statements  
H228 Flammable solid.  
H260 In contact with water releases flammable gases which may ignite spontaneously.  
Precautionary statements  
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P231+P232 Handle under inert gas. Protect from moisture.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.  
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ventilating/lighting/equipment.  
P233 Keep container tightly closed.  
P370+P378 In case of fire: Use for extinction: Special powder for metal fires.  
P335+P334 Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.  
P402+P404 Store in a dry place. Store in a closed container.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.  
National regulations  
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.  
All components of this product are listed on the Canadian Domestic Substances List (DSL).  
SARA Section 313 (specific toxic chemical listings) Substance is not listed.  
California Proposition 65  
Prop 65 - Chemicals known to cause cancer Substance is not listed.  
Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.  
Prop 65 - Developmental toxicity, male Substance is not listed.  
Information about limitation of use: For use only by technically qualified individuals.  
Other regulations, limitations and prohibitive regulations  
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.  
Substance is not listed.  
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.  
Substance is not listed.  
Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.  
Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

---

## **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.