

Issue Date 12-Jan-2018

Revision Date 07-Sep-2021

Version H

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

**Product identifier**

**Product Name** Niobium Alloy Powder (flammable)

**Other means of identification**

**UN/ID No.** 3089

**Synonyms** All niobium alloy powders, columbium alloy powders, C103 powder (former product #516)

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Alloy product manufacture.

**Uses advised against**

**Details of the supplier of the safety data sheet**

**Manufacturer Address**

23661 Birtcher Dr., Lake Forest, CA 92630

U.S.A.

**Emergency telephone number**

**Emergency Telephone** Chemtrec: (949) 407-8904

## 2. HAZARDS IDENTIFICATION

**Classification**

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids

Category 1

**Label elements**

**Emergency Overview**

**Danger**

**Hazard statements**

Flammable solids



**Appearance** Powder

**Physical state** Solid

**Odor** Odorless

**Precautionary Statements - Prevention**

Wear protective gloves/protective clothing/eye protection

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

Ground/bond container and receiving equipment

If dust clouds can occur, use explosion-proof electrical/ ventilating/lighting/equipment

**Precautionary Statements - Response**

In case of fire: Use salt (NaCl) for extinction.

**Hazards not otherwise classified (HNOC)**

Not applicable

**Other Information**

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated:

Titanium dioxide an IARC Group 2B carcinogen.

Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) affects eyes, skin, respiratory system.

Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms** All niobium alloy powders, columbium alloy powders, C103 powder (former product #516).

Chemical Name	CAS No.	Weight-%
Niobium (Columbium)	7440-03-1	40 - >99
Titanium	7440-32-6	0 - 60
Aluminum	7429-90-5	0 - 50
Tantalum	7440-25-7	0 - 30
Tungsten	7440-33-7	0 - 30
Hafnium	7440-58-6	0 - 30
Vanadium	7440-62-2	0 - 10
Molybdenum	7439-98-7	0 - 10
Zirconium	7440-67-7	0 - 5
Hydrogen	1333-74-0	0 - 1.2

### 4. FIRST AID MEASURES

**First aid measures**

**Eye contact** In the case of particles coming in contact with eyes during processing, treat as with any foreign object.

**Skin Contact** None under normal use conditions.

**Inhalation** If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.

**Ingestion** IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

**Most important symptoms and effects, both acute and delayed**

**Symptoms** None anticipated.

**Indication of any immediate medical attention and special treatment needed**

**Note to physicians** Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media**

Isolate large fires and allow to burn out. Smother small fires with salt (NaCl).

**Unsuitable extinguishing media** Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with

the burning material.

#### **Specific hazards arising from the chemical**

Intense heat. Very fine, high surface area material resulting from processing this product may ignite spontaneously at room temperature. WARNING: Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

**Hazardous combustion products** Titanium dioxide an IARC Group 2B carcinogen. Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) affects eyes, skin, respiratory system. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

#### **Explosion data**

**Sensitivity to Mechanical Impact** None.

**Sensitivity to Static Discharge** May be ignited by heat, sparks or flames.

#### **Protective equipment and precautions for firefighters**

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

## **6. ACCIDENTAL RELEASE MEASURES**

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

**Personal precautions** Use personal protective equipment as required.

**For emergency responders** Use personal protective equipment as required. Follow Emergency Response Guidebook, Guide No. 170.

### **Environmental precautions**

**Environmental precautions** Collect spillage to prevent release to the environment.

### **Methods and material for containment and cleaning up**

**Methods for containment** Prevent further leakage or spillage if safe to do so.

**Methods for cleaning up** Sweep or shovel material into dry containers using non-sparking tools. Avoid creating uncontrolled dust.

## **7. HANDLING AND STORAGE**

### **Precautions for safe handling**

**Advice on safe handling** Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

### **Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). For long-term storage, keep sealed in argon-filled steel drums.

**Incompatible materials** Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

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

### **Control parameters**

Chemical Name	ACGIH TLV	OSHA PEL
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Niobium (Columbium) 7440-03-1	-	-
Titanium 7440-32-6	-	-
Aluminum 7429-90-5	TWA: 1 mg/m <sup>3</sup> respirable fraction	TWA: 15 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable fraction
Tungsten 7440-33-7	STEL: 10 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup> W TWA: 5 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> W	(vacated) STEL: 10 mg/m <sup>3</sup> (vacated) STEL: 10 mg/m <sup>3</sup> W
Tantalum 7440-25-7	-	TWA: 5 mg/m <sup>3</sup>
Hafnium 7440-58-6	TWA: 0.5 mg/m <sup>3</sup> TWA: 0.5 mg/m <sup>3</sup> Hf	TWA: 0.5 mg/m <sup>3</sup>
Vanadium 7440-62-2	-	Ceiling: 0.5 mg/m <sup>3</sup> V2O5 respirable dust Ceiling: 0.1 mg/m <sup>3</sup> V2O5 fume
Molybdenum 7439-98-7	TWA: 10 mg/m <sup>3</sup> inhalable fraction TWA: 3 mg/m <sup>3</sup> respirable fraction	-
Zirconium 7440-67-7	STEL: 10 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup> Zr TWA: 5 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> Zr	TWA: 5 mg/m <sup>3</sup> Zr (vacated) STEL: 10 mg/m <sup>3</sup> (vacated) STEL: 10 mg/m <sup>3</sup> Zr
Hydrogen 1333-74-0	-	-

**Appropriate engineering controls**

**Engineering Controls** Avoid generation of uncontrolled particles.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection** When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

**Skin and body protection** Fire/flame resistant/retardant clothing may be appropriate during hot work with the product.

**Respiratory protection** When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

**General Hygiene Considerations** Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Information on basic physical and chemical properties**

<b>Physical state</b>	Solid	<b>Odor</b>	Odorless
<b>Appearance</b>	Powder	<b>Odor threshold</b>	Not applicable
<b>Color</b>	Metallic gray or silver		
<b>Property</b>	<b>Values</b>	<b>Remarks • Method</b>	
<b>pH</b>	-	Not applicable	
<b>Melting point / freezing point</b>	2470 °C / 4480 °F		
<b>Boiling point / boiling range</b>	-		
<b>Flash point</b>	-		
<b>Evaporation rate</b>	-	Not applicable	
<b>Flammability (solid, gas)</b>	-	Flammable	
<b>Flammability Limit in Air</b>	-		
<b>Upper flammability limit:</b>	-		
<b>Lower flammability limit:</b>	-		
<b>Vapor pressure</b>	-	Not applicable	
<b>Vapor density</b>	-	Not applicable	
<b>Specific Gravity</b>	8.57		
<b>Water solubility</b>	Insoluble		

Solubility in other solvents	-	
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidizing properties	Not applicable	

**Other Information**

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	260 lb/ft3

## 10. STABILITY AND REACTIVITY

**Reactivity**

Not applicable

**Chemical stability**

Stable under normal conditions.

**Possibility of Hazardous Reactions**

None under normal processing.

**Hazardous polymerization**

Hazardous polymerization does not occur.

**Conditions to avoid**

Dust formation and dust accumulation.

**Incompatible materials**

Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

**Hazardous Decomposition Products**

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Titanium dioxide an IARC Group 2B carcinogen. Vanadium pentoxide (V2O5) affects eyes, skin, respiratory system. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

## 11. TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure****Product Information**

**Inhalation** Product not classified.

**Eye contact** Product not classified.

**Skin Contact** Product not classified.

**Ingestion** Product not classified.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Titanium	> 5000 mg/kg bw	-	-

7440-32-6			
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Tungsten 7440-33-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.4 mg/L
Tantalum 7440-25-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.18 mg/L
Hafnium 7440-58-6	> 5000 mg/kg bw	-	>4.3mg/L
Vanadium 7440-62-2	> 2000 mg/kg bw	-	-
Molybdenum 7439-98-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Zirconium 7440-67-7	> 5000 mg/kg bw	-	>4.3 mg/L
Hydrogen 1333-74-0	-	-	> 15000 ppm ( Rat ) 1 h

### Information on toxicological effects

**Symptoms** None known.

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

**Acute toxicity** Product not classified.  
**Skin corrosion/irritation** Product not classified.  
**Serious eye damage/eye irritation** Product not classified.  
**Sensitization** Product not classified.  
**Germ cell mutagenicity** Product not classified.  
**Carcinogenicity** Product not classified.

**Reproductive toxicity** Product not classified.  
**STOT - single exposure** Product not classified.  
**STOT - repeated exposure** Product not classified.  
**Aspiration hazard** Product not classified.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Niobium (Columbium) 7440-03-1	-	-	-	-
Titanium 7440-32-6	The 72 h EC50 of titanium dioxide to <i>Pseudokirchnerella subcapitata</i> was 61 mg of TiO <sub>2</sub> /L.	The 96 h LC50 of titanium dioxide to <i>Cyprinodon variegatus</i> was greater than 10,000 mg of TiO <sub>2</sub> /L. The 96 h LC50 of titanium dioxide to <i>Pimephales promelas</i> was greater than 1,000 mg of TiO <sub>2</sub> /L.	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of titanium dioxide to <i>Daphnia Magna</i> was greater than 1000 mg of TiO <sub>2</sub> /L.
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of <i>Pseudokirchneriella subcapitata</i> in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	The 96 h LC50 of aluminum to <i>Oncorhynchus mykiss</i> was 7.4 mg of Al/L at pH 6.5 and 14.6 mg of Al/L at pH 7.5	-	The 48-hr LC50 for <i>Ceriodaphnia dubia</i> exposed to Aluminium chloride increased from 0.72 to greater than 99.6 mg/L with water hardness increasing from 25 to 200 mg/L.
Tungsten	The 72 h EC50 of sodium	The 96 h LC50 of sodium	The 30 min EC50 of sodium	The 48 h EC50 of sodium

7440-33-7	tungstate to Pseudokirchnerella subcapitata was 31.0 mg of W/L.	tungstate to Danio rerio was greater than 106 mg of W/L.	tungstate for activated sludge were greater than 1000 mg/L.	tungstate to Daphnia magna was greater than 96 mg of W/L.
Tantalum 7440-25-7	-	-	-	-
Hafnium 7440-58-6	The 72 h EC50 of hafnium to Pseudokirchnerella subcapitata was greater than 8 ug of Hf/L (100% saturated solution).	The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg Hf/L.	-	The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg Hf/L.
Vanadium 7440-62-2	The 72 h EC50 of vanadium pentoxide to Desmodesmus subspicatus was 2,907 ug of V/L.	The 96 h LC50 of vanadium pentoxide to Pimephales promelas was 1,850 ug of V/L.	The 3 h EC50 of sodium metavanadate for activated sludge was greater than 100 mg/L.	The 48 h EC50 of sodium vanadate to Daphnia magna was 2,661 ug of V/L.
Molybdenum 7439-98-7	The 72 h EC50 of sodium molybdate dihydrate to Pseudokirchnerella subcapitata was 362.9 mg of Mo/L.	The 96 h LC50 of sodium molybdate dihydrate to Pimephales promelas was 644.2 mg/L.	The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.	The 48 h LC50 of sodium molybdate dihydrate to Ceriodaphnia dubia was 1,015 mg/L. The 48 h LC50 of sodium molybdate dihydrate to Daphnia magna was greater than 1,727.8 mg/L.
Zirconium 7440-67-7	The 14 d NOEC of zirconium dichloride oxide to Chlorella vulgaris was greater than 102.5 mg of Zr/L.	The 96 h LL50 of zirconium to Danio rerio was greater than 74.03 mg/L.	-	The 48 h EC50 of zirconium dioxide to Daphnia magna was greater than 74.03 mg of Zr/L.
Hydrogen 1333-74-0	-	-	-	-

**Persistence and degradability**

**Bioaccumulation**

**Mobility**

**Other adverse effects**

**13. DISPOSAL CONSIDERATIONS**

**Waste treatment methods**

- Disposal of wastes** Disposal should be in accordance with applicable regional, national and local laws and regulations.
- Contaminated packaging** Disposal should be in accordance with applicable regional, national and local laws and regulations.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

**14. TRANSPORT INFORMATION**

<b>DOT</b>	Regulated
<b>UN/ID No.</b>	3089
<b>Proper shipping name</b>	Metal powders, flammable, n.o.s. (Niobium Alloy Powder)
<b>Hazard Class</b>	4.1
<b>Packing Group</b>	II

Special Provisions IB8, IP2, IP4, T3, TP33  
 Emergency Response Guide Number 170

**15. REGULATORY INFORMATION**

**International Inventories**

TSCA Complies  
 DSL/NDSL Complies  
 EINECS/ELINCS Complies  
 ENCS Complies  
 IECSC Complies  
 KECL Complies  
 PICCS Not Listed  
 AICS Not Listed

**Legend:**

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory  
 DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List  
 EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances  
 ENCS - Japan Existing and New Chemical Substances  
 IECSC - China Inventory of Existing Chemical Substances  
 KECL - Korean Existing and Evaluated Chemical Substances  
 PICCS - Philippines Inventory of Chemicals and Chemical Substances  
 AICS - Australian Inventory of Chemical Substances

**US Federal Regulations**

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

**SARA 311/312 Hazard Categories**

Acute health hazard No  
 Chronic Health Hazard No  
 Fire hazard Yes  
 Sudden release of pressure hazard No  
 Reactive Hazard No

**CWA (Clean Water Act)**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

**CERCLA**

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

**US State Regulations**

**California Proposition 65**

This product does not contain any Proposition 65 chemicals

**U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Titanium 7440-32-6	X		

Aluminum 7429-90-5	X	X	X
Tungsten 7440-33-7	X	X	X
Tantalum 7440-25-7	X	X	X
Hafnium 7440-58-6	X	X	X
Vanadium 7440-62-2	X	X	X
Molybdenum 7439-98-7	X	X	X
Zirconium 7440-67-7	X	X	X
Hydrogen 1333-74-0	X	X	X

**U.S. EPA Label Information**

EPA Pesticide Registration Number Not applicable

**16. OTHER INFORMATION**

<b>NFPA</b>	Health hazards 0	Flammability 1	Instability 0	Physical and Chemical Properties -
<b>HMIS</b>	Health hazards 1	Flammability 2	Physical hazards 0	Personal protection X

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**Revision Note**

SDS sections updated: 3

**Note:**

The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**

Additional information available from: Safety data sheets and labels available at samaterials.com