



SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 08-Feb-2017

Version I

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Code SAC007
Product Name Niobium E.B. Furnace Slag
Synonyms Columbium E.B. Furnace Slag (Product #118)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Alloy product manufacture

Uses advised against

1.3. Details of the supplier of the safety data sheet

Manufacturer Address
ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA

1.4. Emergency telephone number

Emergency Telephone Chemtrec: +1-703-741-5970

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

2.2. Label elements

Emergency Overview

Appearance Various blends of powders and chunks	Physical state Solid	Odour Odourless
--	-----------------------------	------------------------

2.3 Hazards not otherwise classified (HNOC)

Not applicable

Other Information

Not applicable

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms Columbium E.B. Furnace Slag, (Product #118).

Chemical Name	EC No	CAS No	Weight-%
Niobium	231-113-5	7440-03-1	5 - 65
Diniobium Pentaoxide	215-213-6	1313-96-8	5 - 15
Aluminium	231-072-3	7429-90-5	1 - 15
Aluminium Oxide	215-691-6	1344-28-1	1 - 13
Zirconium Dioxide	215-227-2	1314-23-4	1 - 10
Titanium Dioxide	236-675-5	13463-67-7	0 - 5
Hafnium Dioxide	235-013-2	12055-23-1	0 - 5
Barium Aluminate	-	12254-17-9	0 - 2
Ditantalum Pentaoxide	215-238-2	1314-61-0	0 - 1

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures

Inhalation	If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
Skin Contact	None under normal use conditions.
Eye contact	In the case of particles coming in contact with eyes during processing, treat as with any foreign object.
Ingestion	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms	None anticipated.
-----------------	-------------------

4.3. Indication of any immediate medical attention and special treatment needed

Note to doctors	Treat symptomatically.
------------------------	------------------------

Section 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media
Non-combustible.

Unsuitable extinguishing media
Non-combustible

5.2. Special hazards arising from the substance or mixture

Non-combustible

Hazardous combustion products Not applicable.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective suit. Use personal protective equipment as required.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions
Use personal protective equipment as required.

For emergency responders

Use personal protective equipment as required.

6.2. Environmental precautions

Collect spillage to prevent release to the environment.

6.3. 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. Avoid creating uncontrolled dust.

6.4. Reference to other sections

See Section 12: ECOLOGICAL INFORMATION.

Section 7: HANDLING AND STORAGE**7.1. Precautions for safe handling****Advice on safe handling**

Ensure adequate ventilation, especially in confined areas.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities**Storage Conditions**

Keep in properly labelled containers.

Incompatible materials

None known.

7.3. Specific end use(s)**Risk Management Methods (RMM)**

Not required.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1. Control parameters**

Chemical Name	European Union	United Kingdom	France	Spain	Germany
Niobium 7440-03-1	-	-	-	-	-
Diniobium Pentaoxide 1313-96-8	-	-	-	-	-
Aluminium 7429-90-5	-	STEL: 30 mg/m ³ STEL: 12 mg/m ³ TWA: 10 mg/m ³ TWA: 4 mg/m ³	TWA: 10 mg/m ³ TWA: 5 mg/m ³	TWA: 10 mg/m ³ TWA: 5 mg/m ³	TWA: 4 mg/m ³ TWA: 1.5 mg/m ³
Aluminium Oxide 1344-28-1	-	TWA: 10 mg/m ³ TWA: 4 mg/m ³	TWA: 10 mg/m ³	TWA: 10 mg/m ³	TWA: 4 mg/m ³ TWA: 1.5 mg/m ³ Skin
Zirconium Dioxide 1314-23-4	-	TWA: 5 mg/m ³	-	STEL: 10 mg/m ³ TWA: 5 mg/m ³	-
Titanium Dioxide 13463-67-7	-	STEL: 30 mg/m ³ STEL: 12 mg/m ³ TWA: 10 mg/m ³ TWA: 4 mg/m ³	TWA: 10 mg/m ³	TWA: 10 mg/m ³	Skin
Hafnium Dioxide	-	-	-	TWA: 0.5 mg/m ³	-

12055-23-1					
Barium Aluminate 12254-17-9	-	-	-	-	-
Ditantalum Pentaoxide 1314-61-0	-	-	-	-	-
Chemical Name	Italy	Portugal	Netherlands	Finland	Denmark
Niobium 7440-03-1	-	-	-	-	TWA: 5 mg/m ³ TWA: 0.5 mg/m ³
Diniobium Pentaoxide 1313-96-8	-	-	-	-	-
Aluminium 7429-90-5	-	TWA: 10 mg/m ³ TWA: 5 mg/m ³	TWA: 0.05 mg/m ³	TWA: 1.5 mg/m ³	TWA: 5 mg/m ³ TWA: 2 mg/m ³
Aluminium Oxide 1344-28-1	-	TWA: 10 mg/m ³	TWA: 0.05 mg/m ³	-	TWA: 5 mg/m ³ TWA: 2 mg/m ³
Zirconium Dioxide 1314-23-4	-	STEL: 10 mg/m ³ TWA: 5 mg/m ³	-	TWA: 1 mg/m ³	TWA: 5 mg/m ³
Titanium Dioxide 13463-67-7	-	TWA: 10 mg/m ³	-	-	TWA: 6 mg/m ³
Hafnium Dioxide 12055-23-1	-	TWA: 0.5 mg/m ³	-	TWA: 0.5 mg/m ³	-
Barium Aluminate 12254-17-9	-	-	-	-	-
Ditantalum Pentaoxide 1314-61-0	-	TWA: 5 mg/m ³	-	TWA: 5 mg/m ³	TWA: 5 mg/m ³
Chemical Name	Austria	Switzerland	Poland	Norway	Ireland
Niobium 7440-03-1	STEL 10 mg/m ³ STEL 1 mg/m ³ TWA: 5 mg/m ³ TWA: 0.5 mg/m ³	-	-	-	-
Diniobium Pentaoxide 1313-96-8	-	-	-	-	-
Aluminium 7429-90-5	STEL 20 mg/m ³ TWA: 10 mg/m ³	TWA: 3 mg/m ³	TWA: 2.5 mg/m ³ TWA: 1.2 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	TWA: 1 mg/m ³ TWA: 5 mg/m ³
Aluminium Oxide 1344-28-1	STEL 10 mg/m ³ TWA: 5 mg/m ³	STEL: 24 mg/m ³ TWA: 3 mg/m ³	TWA: 2.5 mg/m ³ TWA: 1.2 mg/m ³	TWA: 10 mg/m ³ STEL: 20 mg/m ³	TWA: 10 mg/m ³ TWA: 4 mg/m ³
Zirconium Dioxide 1314-23-4	TWA: 5 mg/m ³	TWA: 5 mg/m ³	STEL: 10 mg/m ³ TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³
Titanium Dioxide 13463-67-7	STEL 10 mg/m ³ TWA: 5 mg/m ³	TWA: 3 mg/m ³	STEL: 30 mg/m ³ TWA: 10.0 mg/m ³ TWA: 10 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	TWA: 10 mg/m ³ TWA: 4 mg/m ³
Hafnium Dioxide 12055-23-1	TWA: 0.5 mg/m ³	-	TWA: 0.5 mg/m ³	-	-
Barium Aluminate 12254-17-9	-	-	-	-	-
Ditantalum Pentaoxide 1314-61-0	STEL 10 mg/m ³ TWA: 5 mg/m ³	-	-	-	-

Derived No Effect Level (DNEL) No DNELs are available for this product as a whole

Predicted No Effect Concentration (PNEC) No PNECs are available for this product as a whole.

8.2. Exposure controls

Engineering Controls

Avoid generation of uncontrolled particles.

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

Wear protective gloves.

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.

Environmental exposure controls Section 6: ACCIDENTAL RELEASE MEASURES.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state	Solid		
Appearance	Various blends of powders and chunks	Odour	Odourless
Colour	metallic grey or Silver	Odour threshold	Not applicable

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	-	Not applicable
Melting point/freezing point	1800 °C / 3270 °F	Not applicable
Boiling point / boiling range	-	Not applicable
Flash point	-	
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	Not flammable
Flammability Limit in Air		
Upper flammability limit:	-	-
Lower flammability limit	-	-
Vapour pressure	-	Not applicable
Vapour density	-	Not applicable
Specific Gravity	5-7	Not applicable
Water solubility	Insoluble	Not applicable
Solubility(ies)		
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	
Explosive properties	Not applicable	
Oxidising properties	Not applicable	

9.2. Other information

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	140-160 lb/ft ³

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Not applicable.

10.2. Chemical stability

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	None.

10.3. Possibility of hazardous reactions

Hazardous polymerisation

Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions

None under normal processing.

10.4. Conditions to avoid

Dust formation and dust accumulation.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Not applicable.

Section 11: TOXICOLOGICAL INFORMATION**11.1. Information on toxicological effects****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	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Diniobium Pentaoxide	> 8000 mg/kg bw	-	> 3.89 mg/L
Aluminium	15,900 mg/kg bw	-	> 1 mg/L
Aluminium Oxide	15,900 mg/kg bw	-	7.6 mg/L
Zirconium Dioxide	>5000 mg/kg bw	-	>4.3 mg/L
Titanium Dioxide	>5,000 mg/kg bw	-	-
Hafnium Dioxide	>2000 mg/kg bw	-	>4.3 mg/L
Barium Aluminate	-	-	-
Ditantalum Pentaoxide	> 8000 mg/kg bw	-	-

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.**Sensitisation** Product not classified.**Germ cell mutagenicity** Product not classified.**Carcinogenicity** Product not classified.

Chemical Name	ACGIH	IARC	NTP	OSHA
Titanium Dioxide 13463-67-7		Group 2B		X

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

Section 12: ECOLOGICAL INFORMATION

12.1. Toxicity

This product as shipped is not classified for aquatic toxicity

Chemical Name	Algae/aquatic plants	Fish	Toxicity to Micro-organisms	Crustacea
Niobium	-	-	-	-
Diniobium Pentaoxide	The 72 h EC50 of Ditantalum pentaoxide to <i>Desmodesmus subspicatus</i> was greater than 1 mg/L	The 96 h LC50 of Ditantalum pentaoxide to <i>Danio rerio</i> was greater than or equal to 1 mg/L.	The 3 h EC50 of Ditantalum pentaoxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of Ditantalum pentaoxide to <i>Daphnia magna</i> was greater than or equal to 1 mg/L.
Aluminium	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.
Aluminium Oxide	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 chloride to <i>Oncorhynchus mykiss</i> ranged from 7.4 mg of Al/L at pH 6.5 to 14.6 mg of Al/L at pH 7.5. The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Aluminum chloride ranged from 1.16 to 44.8 mg/L with water hardness increasing from 25 to 200 mg/L.	-	The 48-hr EC50 for <i>Ceriodaphnia dubia</i> exposed to Aluminium chloride ranged from 1.9 to 2.6 mg/L with pH ranging from 7.42 to 8.13.
Zirconium Dioxide	The 15 d NOEC of zirconium dichloride oxide to <i>Chlorella vulgaris</i> was greater than 200 mg/L	The 96 h LL50 of zirconium dioxide to <i>Danio rerio</i> was greater than 100 mg/L.	-	The 48 h EC50 of zirconium dioxide to <i>Daphnia magna</i> was greater than 100 mg/L
Titanium Dioxide	The 72 h EC50 of titanium dioxide to <i>Pseudokirchnerella subcapitata</i> was 61 mg of TiO ₂ /L.	The 96h LC50s values of titanium dioxide range from greater than 100 mg TiO ₂ /L for <i>Oncorhynchus mykiss</i> to greater than 1000 mg TiO ₂ /L for <i>Pimephales promelas</i>	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h LC50 of titanium dioxide to <i>Daphnia magna</i> was greater than 100 mg of TiO ₂ /L.
Hafnium Dioxide	The 72 h EC50 of Hafnium dioxide in water to <i>Pseudokirchneriella subcapitata</i> was greater than the solubility limit of 0.008 mg Hf/L	The 96 h LC50 of Hafnium dioxide in water to <i>Danio rerio</i> was greater than the solubility limit of 0.007 mg Hf/L	-	The 48 h EC50 of Hafnium dioxide to <i>Daphnia magna</i> was greater than the solubility limit of 0.007 mg Hf/L
Barium Aluminate	-	-	-	-
Ditantalum Pentaoxide	-	-	-	-

12.2. Persistence and degradability

12.3. Bioaccumulative potential

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria do not apply to inorganic substances.

12.6. Other adverse effects**Section 13: DISPOSAL CONSIDERATIONS****13.1. Waste treatment methods**

Waste from residues/unused products	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.

Section 14: TRANSPORT INFORMATION**IMDG**

14.1 UN/ID no	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard Class	Not regulated
14.4 Packing Group	Not regulated
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable

RID

14.1 UN/ID no	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard Class	Not regulated
14.4 Packing Group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ADR

14.1 UN/ID no	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard Class	Not regulated
14.4 Packing Group	Not regulated
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

ICAO (air)

14.1 UN/ID no	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard Class	Not regulated
14.4 Packing Group	Not applicable
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

IATA

14.1 UN/ID no	Not regulated
14.2 Proper shipping name	Not regulated
14.3 Hazard Class	Not regulated
14.4 Packing Group	Not regulated

Description	Not applicable
14.5 Environmental hazard	Not applicable
14.6 Special Provisions	None

Section 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Name	French RG number	Title
Niobium 7440-03-1	-	-
Diniobium Pentaoxide 1313-96-8	-	-
Aluminium 7429-90-5	RG 32 RG 16, RG 16bis	-
Aluminium Oxide 1344-28-1	-	-
Zirconium Dioxide 1314-23-4	-	-
Titanium Dioxide 13463-67-7	-	-
Hafnium Dioxide 12055-23-1	-	-
Barium Aluminate 12254-17-9	-	-
Ditantalum Pentaoxide 1314-61-0	-	-

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Authorisations and/or restrictions on use:

This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV). This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII).

International Inventories

DSL/NDSL	Complies
EINECS/ELINCS	Not Listed
ENCS	Not Listed
IECSC	Complies
KECL	Not Listed
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

15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

Section 16: OTHER INFORMATION

Issue Date 28-May-2015
Revision Date 08-Feb-2017
Revision Note Updated Section(s): 6, 7, 11, 12, 15.

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Note:

The information provided in this Material 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 ATImetals.com