



SAFETY DATA SHEET

Issue Date 25-Jan-2022

Revision Date 26-Jan-2022

Version 1

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

Product identifier

Product Name Processed Hafnium E.B. Furnace Slag

Other means of identification

Product Code SAC064

Synonyms Processed Hafnium E.B. Furnace Slag; Hafnium E.B. Furnace Slag, Product #1005741

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

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

Emergency telephone number

Emergency Telephone Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements

Emergency Overview

Appearance Chunks with powder **Physical state** Solid **Odor** Odorless

Hazards not otherwise classified (HNOC)

Not applicable

Other Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Processed Hafnium E.B. Furnace Slag; Hafnium E.B. Furnace Slag, Product #1005741.

Chemical Name	CAS No.	Weight-%
Hafnium	7440-58-6	75 - 98
Aluminum	7429-90-5	0 - 18
Iron	7439-89-6	0 - 8

Zirconium	7440-67-7	1.5 - 8
Hafnium Nitride	25817-87-2	0 - 6
Hafnium Dioxide	12055-23-1	0 - 6
Aluminum Oxide	1344-28-1	0 - 3.5

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

Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product.

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.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

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.

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. Avoid creating uncontrolled dust.

7. HANDLING AND STORAGE**Precautions for safe handling**

Advice on safe handling Very fine, high surface area material resulting from processing this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes 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).

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
Hafnium 7440-58-6	TWA: 0.5 mg/m ³ TWA: 0.5 mg/m ³ Hf	TWA: 0.5 mg/m ³
Aluminum 7429-90-5	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction
Zirconium 7440-67-7	STEL: 10 mg/m ³ STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ TWA: 5 mg/m ³ Zr	TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ (vacated) STEL: 10 mg/m ³ Zr
Iron 7439-89-6	-	-
Hafnium Nitride 25817-87-2	-	-
Hafnium Dioxide 12055-23-1	TWA: 0.5 mg/m ³ Hf	-
Aluminum Oxide 1344-28-1	TWA: 1 mg/m ³ respirable fraction	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction

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

Physical state	Solid	Odor	Odorless
Appearance	Chunks with powder	Odor threshold	Not applicable
Color	Metallic gray and light brown		
Property	Values	Remarks • Method	
pH	-		
Melting point / freezing point	-		
Boiling point / boiling range	-		
Flash point	-		
Evaporation rate	-		
Flammability (solid, gas)	-	Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product	
Flammability Limit in Air			
Upper flammability limit:	-		
Lower flammability limit:	-		
Vapor pressure	-	Not applicable	
Vapor density	-	Not applicable	
Specific Gravity	-		
Water solubility	Insoluble in water		
Solubility in other solvents	-		
Partition coefficient	-	Not applicable	
Autoignition temperature	-	Not applicable	
Decomposition temperature	-		
Kinematic viscosity	-	Not applicable	
Dynamic viscosity	-		
Explosive properties	Not applicable		
Oxidizing properties	Not applicable		
<u>Other Information</u>			
Softening point	-		
Molecular weight	-		
VOC Content (%)	Not applicable		
Density	-		
Bulk density	-		

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

Not applicable.

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
Hafnium 7440-58-6	> 5000 mg/kg bw	-	>4.3mg/L
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Zirconium 7440-67-7	> 5000 mg/kg bw	-	>4.3 mg/L
Iron 7439-89-6	98,600 mg/kg bw	-	> 0.25 mg/L
Hafnium Nitride 25817-87-2	-	-	-
Hafnium Dioxide 12055-23-1	>2000 mg/kg bw	-	>4.3 mg/L
Aluminum Oxide 1344-28-1	15,900 mg/kg bw	-	7.6 mg/L

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
Hafnium 7440-58-6	The 72 h EC50 of hafnium to Pseudokirchneriella 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.
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of Pseudokirchneriella subcapitata 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 Oncorhynchus mykiss 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 Ceriodaphnia dubia 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.
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.
Iron 7439-89-6	-	The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of iron oxide to Daphnia magna was greater than 100 mg/L.
Hafnium Nitride 25817-87-2	-	-	-	-
Hafnium Dioxide 12055-23-1	The 72 h EC50 of Hafnium dioxide in water to Pseudokirchneriella subcapitata was greater than the solubility limit of 0.008 mg Hf/L	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
Aluminum Oxide 1344-28-1	The 96-h EC50 values for reduction of biomass of Pseudokirchneriella subcapitata 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 Oncorhynchus mykiss 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 Pimephales promelas exposed to Aluminium 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 Ceriodaphnia dubia exposed to Aluminium chloride ranged from 1.9 to 2.6 mg/L with pH ranging from 7.42 to 8.13.

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**DOT**

Not regulated

15. REGULATORY INFORMATION

International Inventories

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 contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Aluminum Oxide - 1344-28-1	1344-28-1	0 - 3.5	1.0 (fibrous forms only)

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
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
Hafnium 7440-58-6	X	X	X
Aluminum 7429-90-5	X	X	X
Zirconium 7440-67-7	X	X	X
Aluminum Oxide 1344-28-1	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

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

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Revision Note

New Safety Data Sheet

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 ATImetals.com