



# SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 21-Oct-2024

Version 6

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

### 1.1. Product identifier

**Product Code** SAC010  
**Product Name** Hafnium and Hafnium Alloys

**Synonyms** Hafnium and Hafnium Alloys: Includes massive forms of hafnium including crystal bar, foil or other massive forms. Hafnium foil, Hafnium Compacts (Product #431).

### 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

ATI Specialty Alloys & Components, 1600 Old Salem Rd NE, Albany, OR 97321 USA

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**Contact Point** ATI SDS Manager: +1-412-225-4911

### 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

Not Hazardous Not a hazardous substance or mixture according to the Globally Harmonised System (GHS)

### 2.2. Label elements

#### Emergency Overview

<b>Appearance</b> Various massive product forms	<b>Physical state</b> Solid	<b>Odour</b> Odourless
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### 2.3 Hazards not otherwise classified (HNOC)

Not applicable

### Other Information

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## Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

**Synonyms** Hafnium and Hafnium Alloys: Includes massive forms of hafnium including crystal bar, foil or other massive forms, Hafnium foil, Hafnium Compacts, (Product #431).

Chemical Name	EC No	CAS No	Weight-%
Hafnium	231-166-4	7440-58-6	95- >99
Zirconium	231-176-9	7440-67-7	0-5

## 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** Not an expected route of exposure.

### 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: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

#### Suitable extinguishing media

Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Isolate large fires and allow to burn out. Smother small fires with salt (NaCl) or class D dry powder fire extinguisher.

#### 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.

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

Intense heat. 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 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 minimise combustible dust hazard. Hafnium foil, which is shipped as rolls, may ignite after unrolling if exposed to temperatures between 350-450°C, depending on foil thickness and rate of heating

**Hazardous combustion products** Not applicable.

### 5.3. Advice for firefighters

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

## 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

Not applicable to massive product.

### 6.3. Methods and material for containment and cleaning up

**Methods for containment** Not applicable to massive product.

**Methods for cleaning up** Not applicable to massive product.

### 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**

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 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 minimise combustible dust hazard. Hafnium foil, which is shipped as rolls, may ignite after unrolling if exposed to temperatures between 350-450°C, depending on foil thickness and rate of heating.

#### **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 chips, turnings, dust, and other small particles 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.

### 7.3. Specific end use(s)

#### **Risk Management Methods (RMM)**

Not applicable.

## Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

Chemical Name	European Union	United Kingdom	France	Spain	Germany
Hafnium	-	-	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	-

7440-58-6					
Zirconium 7440-67-7	-	TWA: 5 mg/m <sup>3</sup>	-	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup> Ceiling / Peak: 1 mg/m <sup>3</sup>
<b>Chemical Name</b>	<b>Italy</b>	<b>Portugal</b>	<b>Netherlands</b>	<b>Finland</b>	<b>Denmark</b>
Hafnium 7440-58-6	-	TWA: 0.5 mg/m <sup>3</sup>	-	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>
Zirconium 7440-67-7	-	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	-	TWA: 1 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>
<b>Chemical Name</b>	<b>Austria</b>	<b>Switzerland</b>	<b>Poland</b>	<b>Norway</b>	<b>Ireland</b>
Hafnium 7440-58-6	STEL 5 mg/m <sup>3</sup> TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>	TWA: 0.5 mg/m <sup>3</sup> STEL: 1.5 mg/m <sup>3</sup>
Zirconium 7440-67-7	TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup>	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>

**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

Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.

#### 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 contaminate 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

<b>Physical state</b>	Solid	<b>Odour</b>	Odourless
<b>Appearance</b>	Various massive product forms	<b>Odour threshold</b>	Not applicable
<b>Colour</b>	metallic grey or Silver		
<b>Property</b>	<b>Values</b>	<b>Remarks • Method</b>	
<b>pH</b>	-	Not applicable	
<b>Melting point / freezing point</b>	2230 °C / 4050 °F		
<b>Boiling point / boiling range</b>	-		
<b>Flash point</b>	-		
<b>Evaporation rate</b>	-	Not applicable	
<b>Flammability (solid, gas)</b>	350-450 °C	Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Hafnium foil, which is shipped as rolls, may ignite after unrolling if exposed to temperatures between 350-450°C, depending on foil thickness and rate of heating.	
<b>Flammability Limit in Air</b>			
<b>Upper flammability limit:</b>	-		

Lower flammability limit	-	-
Vapour pressure	-	Not applicable
Vapour density	-	Not applicable
Specific Gravity	13.30	
Water solubility	Insoluble	
Solubility(ies)		
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidising properties	Not applicable	

**9.2. Other information**

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	350-830 lb/ft3

**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**

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.

**10.6. Hazardous decomposition products**

Not applicable.

**Section 11: TOXICOLOGICAL INFORMATION****11.1. Information on toxicological effects****Product Information**

<b>Inhalation</b>	Not an expected route of exposure for product in massive form.
<b>Eye contact</b>	Not an expected route of exposure for product in massive form.
<b>Skin Contact</b>	Product not classified.
<b>Ingestion</b>	Not an expected route of exposure for product in massive form.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hafnium	> 5000 mg/kg bw	-	>4.3mg/L
Zirconium	> 5000 mg/kg bw	-	>4.3 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.

**Sensitisation** 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.

**Target Organ Effects** None known.

**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 microorganisms	Crustacea
Hafnium	The 72 h EC50 of hafnium to <i>Pseudokirchneriella subcapitata</i> was greater than 8 ug of Hf/L (100% saturated solution).	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.
Zirconium	The 14 d NOEC of zirconium dichloride oxide to <i>Chlorella vulgaris</i> was greater than 102.5 mg of Zr/L.	The 96 h LL50 of zirconium to <i>Danio rerio</i> was greater than 74.03 mg/L.	-	The 48 h EC50 of zirconium dioxide to <i>Daphnia magna</i> was greater than 74.03 mg of Zr/L.

### 12.2. Persistence and degradability

**12.3. Bioaccumulative potential****12.4. Mobility in soil**

**Mobility**

**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**

<b>Waste from residues/unused products</b>	Disposal should be in accordance with applicable regional, national and local laws and regulations.
<b>Contaminated packaging</b>	None anticipated.

## Section 14: TRANSPORT INFORMATION

**IMDG**

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

**RID**

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

**ADR**

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

**ICAO (air)**

<b>14.1 UN/ID no</b>	Not regulated
<b>14.2 Proper shipping name</b>	Not regulated
<b>14.3 Hazard Class</b>	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
Hafnium 7440-58-6	-	-
Zirconium 7440-67-7	-	-

#### 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	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
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

Prepared By



**Issue Date** 28-May-2015  
**Revision Date** 21-Oct-2024  
**Revision Note** SDS sections updated: 1, 16.

**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 [ATImaterials.com](http://ATImaterials.com)