



# SAFETY DATA SHEET

Issue Date 28-May-2015

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Version (

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

### 1.1. Product identifier

**Product Code** SAC005  
*Product Name* Hafnium Oxide

**Synonyms** Hafnium Oxide grades P, R, S and Spectro (Prod# 417, 404)

### 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*

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

### 2.2. Label elements

#### Emergency Overview

**Appearance** Powder **Physical state** Solid **Odour** Odourless

### 2.3 Hazards not otherwise classified (HNOC)

Not applicable

### Other Information

## Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1 Substances

**Synonyms** Hafnium Oxide grades P, R, S and Spectro (Prod# 417, 404).

Chemical Name	EC No	CAS No	Weight-%
Hafnium Dioxide	235-013-2	12055-23-1	96-100
Zirconium Dioxide	215-227-2	1314-23-4	0-4

## Section 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

<b>Inhalation</b>	If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
<b>Skin Contact</b>	None under normal use conditions.
<b>Eye contact</b>	In the case of particles coming in contact with eyes during processing, treat as with any foreign object.
<b>Ingestion</b>	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

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

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**

Handle in accordance with good industrial hygiene and safety practice.

**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
Hafnium Dioxide 12055-23-1	-	-	-	TWA: 0.5 mg/m <sup>3</sup>	-
Zirconium Dioxide 1314-23-4	-	TWA: 5 mg/m <sup>3</sup>	-	STEL: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>	-
Chemical Name	Italy	Portugal	Netherlands	Finland	Denmark
Hafnium Dioxide 12055-23-1	-	TWA: 0.5 mg/m <sup>3</sup>	-	TWA: 0.5 mg/m <sup>3</sup>	-
Zirconium Dioxide 1314-23-4	-	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>
Chemical Name	Austria	Switzerland	Poland	Norway	Ireland
Hafnium Dioxide 12055-23-1	TWA: 0.5 mg/m <sup>3</sup>	-	TWA: 0.5 mg/m <sup>3</sup>	-	-
Zirconium Dioxide 1314-23-4	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**

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 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>Appearance</b>	Powder	<b>Odour</b>	Odourless
<b>Colour</b>	white	<b>Odour threshold</b>	Not applicable
<b>Property</b>	<b>Values</b>	<b>Remarks • Method</b>	
pH	-		
Melting point/freezing point	2760 °C / 5000 °F		
Boiling point / boiling range	-		
Flash point	-	Not applicable	
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	9.68		
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	89-180 lb/ft <sup>3</sup>

## 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

<b>Inhalation</b>	Product not classified.
<b>Eye contact</b>	Product not classified.
<b>Skin Contact</b>	Product not classified.
<b>Ingestion</b>	Product not classified.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hafnium Dioxide	>2000 mg/kg bw	-	>4.3 mg/L
Zirconium Dioxide	>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

**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** .

**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
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
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

### 12.2. Persistence and degradability

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### 12.3. Bioaccumulative potential

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### 12.4. Mobility in soil

#### Mobility

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### 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	Not applicable

**IBC Code****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

<b>Section 15: REGULATORY INFORMATION</b>
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**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Chemical Name	French RG number	Title
Hafnium Dioxide 12055-23-1	-	-
Zirconium Dioxide 1314-23-4	-	-

**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	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**

**Prepared By**

**Issue Date** 28-May-2015

**Revision Date** 22-Jan-2018

**Revision Note** Updated Section(s): 2, 5, 8, 9, 10, 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