



# SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 22-Jan-2018

Version 4

## Section 1: PRODUCT AND COMPANY IDENTIFICATION

### Product identifier

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

### Other means of identification

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

**Registration Number(s)**

### 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**

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

#### **Emergency telephone number**

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

## Section 2: HAZARDS IDENTIFICATION

### Classification of the substance or mixture

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

### Label elements

#### Emergency Overview

#### Hazard statements

<b>Appearance</b> Powder	<b>Physical state</b> Solid	<b>Odor</b> Odorless
--------------------------	-----------------------------	----------------------

#### Precautionary Statements - Prevention

•

#### Precautionary Statements - Response

•

#### Precautionary Statements - Storage

•

#### Precautionary Statements - Disposal

•

### Other Information

Hazards not otherwise classified (HNOC)

• Not applicable

## Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

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

Chemical Name	Weight-%	ENCS	ISHL No.	CAS No.
Hafnium Dioxide 12055-23-1	96-100	X	-	12055-23-1

Zirconium Dioxide 1314-23-4	0-4	X	-	1314-23-4
--------------------------------	-----	---	---	-----------

Chemical Name	Poisonous and Deleterious Substances Control Law	
Hafnium Dioxide 12055-23-1	-	
Zirconium Dioxide 1314-23-4	-	
Chemical Name	Class 1	Class 2
Hafnium Dioxide 12055-23-1	-	-
Zirconium Dioxide 1314-23-4	-	-

#### Section 4: 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.
<b>Symptoms</b>	None anticipated.
<b>Inhalation</b>	Product not classified.
<b>Skin Contact</b>	Product not classified.
<b>Eye contact</b>	Product not classified.
<b>Ingestion</b>	Product not classified.
<b>Note to physicians</b>	Treat symptomatically.

#### Section 5: FIRE FIGHTING MEASURES

<b>Flammable properties</b>	Non-combustible.
<b>Explosive properties</b>	Not applicable.
<b>Suitable extinguishing media</b>	Non-combustible.
<b>Unsuitable extinguishing media</b>	Non-combustible.
<b>Specific hazards arising from the chemical</b>	Non-combustible.
<b>Hazardous combustion products</b>	Not applicable.
<b>Special protective equipment for fire-fighters</b>	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

#### Section 6: ACCIDENTAL RELEASE MEASURES

<b>Personal precautions</b>	Use personal protective equipment as required.
-----------------------------	--

<b>For emergency responders</b>	Use personal protective equipment as required.
<b>Environmental precautions</b>	Collect spillage to prevent release to the environment.
<b>Methods for containment</b>	Prevent further leakage or spillage if safe to do so.
<b>Methods for cleaning up</b>	Sweep or shovel material into dry containers. Avoid creating uncontrolled dust.

## Section 7: HANDLING AND STORAGE

### Handling

**Advice on safe handling** Handle in accordance with good industrial hygiene and safety practice.

### Storage

**Storage Conditions** Keep in properly labeled containers.

**Incompatible materials** None known.

## Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### Exposure Guidelines

Chemical Name	Japan	ISHL Working Environmental Evaluation Standards - Administrative Control Levels	ACGIH TLV
Hafnium Dioxide 12055-23-1	-	-	TWA: 0.5 mg/m <sup>3</sup> Hf
Zirconium Dioxide 1314-23-4	-	-	STEL: 10 mg/m <sup>3</sup> Zr TWA: 5 mg/m <sup>3</sup> Zr

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

### Personal Protective Equipment

#### **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.

#### **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.

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

## Section 9: 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>	white		
<b><u>Property</u></b>	<b><u>Values</u></b>	<b><u>Remarks • Method</u></b>	
<b>pH</b>	-		
<b>Melting point/freezing point</b>	2760 °C / 5000 °F		
<b>Boiling point / boiling range</b>	-		
<b>Flash point</b>	-	Not applicable	
<b>Evaporation rate</b>	-	Not applicable	
<b>Flammability (solid, gas)</b>	-	Not flammable	
<b>Flammability Limit in Air</b>			
<b>Upper flammability limit:</b>	-		

Lower flammability limit:	-	
Vapor pressure	-	Not applicable
Vapor 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	
Oxidizing properties	Not applicable	
Softening point	-	
Molecular weight	-	
VOC Content (%)	Not applicable	
Density	-	
Bulk density	89-180 lb/ft3	

## Section 10: STABILITY AND REACTIVITY

### Reactivity

Not applicable

### Stability

Stable under normal conditions.

#### Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

**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** None known

**Hazardous Decomposition Products** Not applicable

## Section 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 Dioxide 12055-23-1	>2000 mg/kg bw	-	>4.3 mg/L
Zirconium Dioxide 1314-23-4	>5000 mg/kg bw	-	>4.3 mg/L

### Information on toxicological effects

**Symptoms** None known.

**Acute toxicity**

**Numerical measures of toxicity - Product Information**

**Numerical measures of toxicity - Component Information**

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

**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.

**Sensitization** Product not classified.

**Germ cell mutagenicity** Product not classified.

**Carcinogenicity** Product not classified.

Chemical Name	Japan	IARC
Hafnium Dioxide 12055-23-1		-
Zirconium Dioxide 1314-23-4		-

**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

**Ecotoxicity**

This product as shipped is not classified for aquatic toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Hafnium Dioxide	<i>The 72 h EC50 of Hafnium dioxide in water to Pseudokirchneriella subcapitata was greater than the solubility limit of 0.008 mg Hf/L</i>	<i>The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg Hf/L</i>	-	<i>The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg Hf/L</i>

Zirconium Dioxide	<i>The 15 d NOEC of zirconium dichloride oxide to Chlorella vulgaris was greater than 200 mg/L</i>	<i>The 96 h LL50 of zirconium dioxide to Danio rerio was greater than 100 mg/L.</i>	-	<i>The 48 h EC50 of zirconium dioxide to Daphnia magna was greater than 100 mg/L</i>
-------------------	--	---	---	--

**Persistence and degradability** .

**Bioaccumulation** .

**Mobility** .

**Other adverse effects**

Chemical Name	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Endocrine disrupting potential
Hafnium Dioxide	-	-	-
Zirconium Dioxide	-	-	-

### Section 13: DISPOSAL CONSIDERATIONS

**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** Not regulated

**ICAO (air)** Not regulated

**ADR** Not regulated

**IATA** Not regulated  
Japan

### Section 15: REGULATORY INFORMATION

**International Inventories**

<b>DSL/NDSL</b>	Complies
<b>EINECS/ELINCS</b>	Complies
<b>ENCS</b>	Complies
<b>IECSC</b>	Complies
<b>KECL</b>	Complies
<b>PICCS</b>	Not Listed
<b>AICS</b>	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

## Industrial Safety and Health Law

Chemical Name	Dangerous Substances	organic solvents	Harmful Substances Whose Names Are to be Indicated on the Label	ISHL - Prevention of Hazards Due to Specified Chemical Substances (Class 2)	Prevention of Lead Poisoning
Hafnium Dioxide 12055-23-1	>1 %	Not applicable	Not applicable	-	-
Zirconium Dioxide 1314-23-4	>1 %	Not applicable	Not applicable	-	-

Chemical Name	Class 2	Class 1	Poisonous and Deleterious Substances Control Law	Fire Service Law:
Hafnium Dioxide 12055-23-1	Not applicable	-	Not applicable	-
Zirconium Dioxide 1314-23-4	Not applicable	-	Not applicable	-

### 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.**Key or legend to abbreviations and acronyms used in the safety data sheet**

.

**Note:**

This SDS complies with the requirements of JIS Z 7250:2010 and JIS Z 7252:2009 (Japan)

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