



# SAFETY DATA SHEET

Issue Date 08-Jul-2015

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Version H

## Section 1: PRODUCT AND COMPANY IDENTIFICATION

### Product identifier

**Product Name** Hafnium Tetrachloride  
**Product Code** SAC027

### Other means of identification

**UN/ID No.** 1759  
**Synonyms** Hafnium Tetrachloride; Hafnium Chloride, (Product #405)

**Registration Number(s)**

### Recommended use of the chemical and restrictions on use

**Recommended Use** Hafnium compounds

**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

Corrosive to metals	Category 1
Skin corrosion/irritation	Category 1 Sub-category B

### Label elements

#### Emergency Overview

<b>Signal word</b> Danger
<b>Hazard statements</b> H290 - May be corrosive to metals H314 - Causes severe skin burns and eye damage


**Appearance** Powder

**Physical state** Solid

**Odor** Pungent, Slight chlorine.

**Precautionary Statements - Prevention**

- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/gas/mist

**Precautionary Statements - Response**

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. • Immediately call a POISON CENTER or doctor/physician

IF ON SKIN (or hair): • Brush off loose particles from skin. Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

**Precautionary Statements - Storage**

- Store in a dry place
- Store in corrosion-resistant container

**Precautionary Statements - Disposal**

- Dispose of contents/container to an approved waste disposal plant

**Other Information**

Hazards not otherwise classified (HNOC)

- Not applicable

### Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms**

Hafnium Tetrachloride: Hafnium Chloride, (Product #405)

Chemical Name	Weight-%	ENCS	ISHL No.	CAS No.
Hafnium Tetrachloride 13499-05-3	>95	X	-	13499-05-3
Zirconium Tetrachloride 10026-11-6	<4	X	-	10026-11-6

Chemical Name	Poisonous and Deleterious Substances Control Law	
Hafnium Tetrachloride 13499-05-3	-	
Zirconium Tetrachloride 10026-11-6	-	
Chemical Name	Class 1	Class 2
Hafnium Tetrachloride 13499-05-3	-	-
Zirconium Tetrachloride 10026-11-6	-	-

### Section 4: FIRST AID MEASURES

**Inhalation**

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician or poison control center immediately.

**Skin Contact**

Brush off loose particles from skin. Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

**Eye contact**

Flush with water for 15 minutes. See a physician.

**Ingestion**

Do NOT induce vomiting. Have patient drink large quantities of water if able. Call Physician immediately for further instructions.

**Symptoms**

May cause acute gastrointestinal effects if swallowed. Contact with moist skin may cause skin burns. May cause breathing difficulties if inhaled.

**Inhalation**

Product not classified.

**Skin Contact**

Causes severe skin burns.

<b>Eye contact</b>	Causes severe eye damage.
<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>	If a fire occurs in the area, avoid water contact with the product to prevent evolution of hazardous gases.
<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. Follow Emergency Response Guidebook, Guide No. 137.
<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. Wash the spill location thoroughly with water. Respiratory protection may be needed. Skin and eye protection should be used during cleanup.

### Section 7: HANDLING AND STORAGE

<b>Handling</b>	
<b>Advice on safe handling</b>	Handle in accordance with good industrial hygiene and safety practice. Protect from moisture. Reacts with water. Ensure adequate ventilation, especially in confined areas. Handle under inert gas such as nitrogen or argon to maintain the integrity of the product.
<b>Storage</b>	
<b>Storage Conditions</b>	Keep in properly labeled containers. Keep in a dry, cool and well-ventilated place. Protect from direct sunlight. Containers may become pressurized: Handle and open container with care.
<b>Incompatible materials</b>	Water, alcohols, phenols, and amines. Rubber, coatings, and some plastics. Reacts with metals to produce heat and corrosive gases.

### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>Exposure Guidelines</b>	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies
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Chemical Name	Japan	ISHL Working Environmental Evaluation Standards - Administrative Control Levels	ACGIH TLV
Hafnium Tetrachloride 13499-05-3	-	-	TWA: 0.5 mg/m <sup>3</sup> Hf
Zirconium Tetrachloride 10026-11-6	-	-	STEL: 10 mg/m <sup>3</sup> Zr TWA: 5 mg/m <sup>3</sup> Zr

**Engineering Controls** Avoid generation of uncontrolled particles. Local exhaust ventilation during processing is recommended.

#### **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**

If a risk of eye injury or irritation is present, appropriate eye protection is recommended; for example, tight-fitting goggles, foam-lined safety glasses, face shield, or other protective equipment that shields the eyes.

##### **Skin and body protection**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**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>	Pungent, Slight chlorine.
<b>Appearance</b>	Powder	<b>Odor threshold</b>	
<b>Color</b>	white, orange		
<b>Property</b>	<b>Values</b>	<b>Remarks • Method</b>	
<b>pH</b>	<1		
<b>Melting point/freezing point</b>	320 °C / 610 °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>	-		
<b>Lower flammability limit:</b>	-		
<b>Vapor pressure</b>	-	Not applicable	
<b>Vapor density</b>	-	Not applicable	
<b>Specific Gravity</b>	2.8		
<b>Water solubility</b>	Reacts with water	hydrolyzes	
<b>Solubility(ies)</b>			
<b>Partition coefficient</b>	-		
<b>Autoignition temperature</b>	-	Not applicable	
<b>Decomposition temperature</b>	-	Not applicable	
<b>Kinematic viscosity</b>	-	Not applicable	
<b>Dynamic viscosity</b>	-	Not applicable	
<b>Explosive properties</b>	Not applicable		
<b>Oxidizing properties</b>	Not applicable		
<b>Softening point</b>	-		
<b>Molecular weight</b>	320.30		
<b>VOC Content (%)</b>	Not applicable		
<b>Density</b>	-		
<b>Bulk density</b>	110-130lb/ft <sup>3</sup>		

## Section 10: STABILITY AND REACTIVITY

**Reactivity**

Reacts with water

**Stability**

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

**Possibility of Hazardous Reactions** Reacts with water**Hazardous polymerization** Hazardous polymerization does not occur**Conditions to avoid** Unintentional contact with water**Incompatible materials** Water, alcohols, phenols, and amines. Rubber, coatings, and some plastics. Reacts with metals to produce heat and corrosive gases.**Hazardous Decomposition Products** Reacts with water to produce hydrogen chloride gas or hydrochloric acid and heat.**Section 11: TOXICOLOGICAL INFORMATION**Information on likely routes of exposure**Product Information****Inhalation** Product not classified.**Eye contact** Causes severe eye damage.**Skin Contact** Causes severe skin burns.**Ingestion** Product not classified.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hafnium Tetrachloride 13499-05-3	112 mg/kg bw	-	-
Zirconium Tetrachloride 10026-11-6	-	-	-

Information on toxicological effects**Symptoms** May cause skin burns. May cause severe upper respiratory irritation if inhaled. May cause acute gastrointestinal effects if swallowed.Acute toxicity**Numerical measures of toxicity - Product Information****Numerical measures of toxicity - Component Information**

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hafnium Tetrachloride	112 mg/kg bw	-	-
Zirconium Tetrachloride	-	-	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure**Skin corrosion/irritation** May cause severe skin burns.

**Serious eye damage/eye irritation** May cause serious eye damage.

**Sensitization** Product not classified.

**Germ cell mutagenicity** Product not classified.

**Carcinogenicity** Product not classified.

Chemical Name	Japan	IARC
Hafnium Tetrachloride 13499-05-3		-
Zirconium Tetrachloride 10026-11-6		-

**Reproductive toxicity** Product not classified.

**STOT - single exposure** Product not classified.

**STOT - repeated exposure** Product not classified.

**Target Organ Effects** Product not classified.

**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 Tetrachloride	<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 Tetrachloride	<i>The 14 d NOEC of zirconium tetrachloride to Chlorella vulgaris was greater than 262 mg of ZrCl4/L.</i>	<i>The 96h LC50 value of zirconium tetrachloride to Oncorhynchus mykiss was greater than 51 mg ZrCl4/L and the 96 h LL50 of zirconium tetrachloride to Danio rerio was greater than 190 mg of ZrCl4/L</i>	-	<i>The 48 h EC50 of zirconium tetrachloride to Daphnia magna was greater than 190 mg of ZrCl4/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 Tetrachloride	-	-	-
Zirconium Tetrachloride	-	-	-

### Section 13: DISPOSAL CONSIDERATIONS

<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>	Disposal should be in accordance with applicable regional, national and local laws and regulations.

### Section 14: TRANSPORT INFORMATION

<b>UN Number</b>	1759
<b>Packing Group</b>	III
<b>Proper shipping name</b>	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
<b>Hazard Class</b>	8
<b>Special Provisions</b>	128, IB8, IP3, T1, TP33

#### IMDG

<b>Proper shipping name</b>	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
<b>Hazard Class</b>	8
<b>UN/ID No.</b>	1759
<b>Packing Group</b>	III
<b>Special Provisions</b>	128, IB8, IP3, T1, TP33

#### ICAO (air)

<b>UN/ID No.</b>	1759
<b>Proper shipping name</b>	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
<b>Hazard Class</b>	8
<b>Packing Group</b>	III
<b>Special Provisions</b>	128, IB8, IP3, T1, TP33

#### ADR

<b>UN/ID No.</b>	1759
<b>Proper shipping name</b>	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
<b>Hazard Class</b>	8
<b>Packing Group</b>	III
<b>ERG Code</b>	137
<b>Special Provisions</b>	128, IB8, IP3, T1, TP33

#### IATA

<b>UN/ID No.</b>	1759
<b>Proper shipping name</b>	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
<b>Hazard Class</b>	8
<b>Packing Group</b>	III
<b>Special Provisions</b>	128, IB8, IP3, T1, TP33

#### Japan

UN Number	1759
Proper shipping name	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
Hazard Class	8
Packing Group	III
Special Provisions	128, IB8, IP3, T1, TP33

### Section 15: REGULATORY INFORMATION

#### International Inventories

<b>DSL/NDSL</b>	Complies
<b>EINECS/ELINCS</b>	Complies

<b>ENCS</b>	Complies
<b>IECSC</b>	Not Listed
<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/NDL** - 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

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 Tetrachloride 13499-05-3	>1 %	Not applicable	Not applicable	-	-
Zirconium Tetrachloride 10026-11-6	>1 %	Not applicable	Not applicable	-	-

Chemical Name	Class 2	Class 1	Poisonous and Deleterious Substances Control Law	Fire Service Law:
Hafnium Tetrachloride 13499-05-3	Not applicable	-	Not applicable	-
Zirconium Tetrachloride 10026-11-6	Not applicable	-	Not applicable	-

### Section 16: OTHER INFORMATION

**Prepared By**

**Issue Date** 08-Jul-2015

**Revision Date** 15-Jan-2018

**Revision Note** Updated Section(s): 2, 4, 5, 7, 8, 9, 10, 11, 16.

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

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**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