



# SAFETY DATA SHEET

Issue Date 08-Jul-2015

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Version 4

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

### Product identifier

**Product Name** Hafnium Tetrachloride

### Other means of identification

**Product Code** SAC027

**UN/ID No.** 1759

**Synonyms** Hafnium Tetrachloride; Hafnium Chloride, (Product #405)

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

**Recommended Use** Chemical intermediate.

**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 material is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin corrosion/irritation	Category 1B
May be corrosive to metals	Category 1

### **Label elements**

#### Emergency Overview

**Danger**

#### **Hazard statements**

May be corrosive to metals

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

Do not breathe dust/gas/mist

**Precautionary Statements - Response**

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting

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 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

Wash contaminated clothing before reuse

Absorb spillage to prevent material damage

**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

**Hazards not otherwise classified (HNOC)**

Reacts violently with water (EUH014)

**Other Information**

Harmful if swallowed

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Synonyms**

Hafnium Tetrachloride: Hafnium Chloride, (Product #405).

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

**4. FIRST AID MEASURES****First aid measures****Eye contact**

Flush with water for 15 minutes. See a physician.

**Skin Contact**

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

**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.

**Ingestion**

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

**Most important symptoms and effects, both acute and delayed****Symptoms**

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

**Indication of any immediate medical attention and special treatment needed****Note to physicians**

Treat symptomatically.

**5. FIRE-FIGHTING MEASURES****Suitable extinguishing media**

Non-combustible.

**Unsuitable extinguishing media** If a fire occurs in the area, avoid water contact with the product to prevent evolution of hazardous gases.

**Specific hazards arising from the chemical**

Non-combustible.

**Hazardous combustion products** Hydrogen chloride gas may cause respiratory and/or eye irritation.

**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. Follow Emergency Response Guidebook, Guide No. 154.

**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. Wash the spill location thoroughly with water. Respiratory protection may be needed. Skin and eye protection should be used during cleanup.

## 7. HANDLING AND STORAGE

**Precautions for safe handling**

**Advice on safe handling** 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.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep in corrosion resistant containers. 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.

**Incompatible materials** Water, alcohols, phenols, and amines. Rubber, coatings, and some plastics. Reacts with metals to produce heat and corrosive gases.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**

Chemical Name	ACGIH TLV	OSHA PEL
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	TWA: 5 mg/m <sup>3</sup> Zr (vacated) STEL: 10 mg/m <sup>3</sup> Zr

**Appropriate engineering controls**

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

**Individual protection measures, such as personal protective equipment**

**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.

**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**

<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><u>Property</u></b>	<b><u>Values</u></b>	<b><u>Remarks • Method</u></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 in other solvents</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	

**Other Information**

<b>Softening point</b>	-
<b>Molecular weight</b>	320.30 of Hafnium Tetrachloride
<b>VOC Content (%)</b>	Not applicable
<b>Density</b>	-
<b>Bulk density</b>	110-130lb/ft3

## 10. STABILITY AND REACTIVITY

### Reactivity

Reacts with water.

### Chemical stability

Stable under normal conditions.

### 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.

## 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**      Harmful if swallowed.

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. May cause burning sensation or redness in the eyes.

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

**Acute toxicity**      Harmful if swallowed.

**Skin corrosion/irritation**      Causes severe skin burns.

**Serious eye damage/eye irritation**      Causes severe eye damage.

**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 Tetrachloride 13499-05-3	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 Tetrachloride 10026-11-6	The 14 d NOEC of zirconium tetrachloride to <i>Chlorella vulgaris</i> was greater than 262 mg of ZrCl <sub>4</sub> /L.	The 96h LC50 value of zirconium tetrachloride to <i>Oncorhynchus mykiss</i> was greater than 51 mg ZrCl <sub>4</sub> /L and the 96 h LL50 of zirconium tetrachloride to <i>Danio rerio</i> was greater than 190 mg of ZrCl <sub>4</sub> /L.	-	The 48 h EC50 of zirconium tetrachloride to <i>Daphnia magna</i> was greater than 190 mg of ZrCl <sub>4</sub> /L.

### 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.

## 14. TRANSPORT INFORMATION

<b>DOT</b>	Regulated
<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
<b>Emergency Response Guide Number</b>	154

## 15. REGULATORY INFORMATION

### International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Not Listed
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

**US Federal Regulations****SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

**SARA 311/312 Hazard Categories**

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

**CWA (Clean Water Act)**

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Zirconium Tetrachloride 10026-11-6	5000 lb			X

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs
Zirconium Tetrachloride 10026-11-6	5000 lb

**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
Zirconium Tetrachloride 10026-11-6	X	X	X

**U.S. EPA Label Information**

**EPA Pesticide Registration Number** Not applicable

**16. OTHER INFORMATION**

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<b>NFPA</b>	Health hazards 1	Flammability 0	Instability 1	Physical and Chemical Properties -
<b>HMIS</b>	Health hazards 2	Flammability 0	Physical hazards 1	Personal protection X
<i>Chronic Hazard Star Legend</i>		<i>* = Chronic Health Hazard</i>		

**Prepared By**

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**Revision Note**

SDS sections updated: 2, 5, 6, 9, 11, 12, 14

**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