# SAFETY DATA SHEET

**Issue Date** 08-Jul-2015 **Revision Date** 23-Feb-2021 **Version** 6

## Section 1: PRODUCT AND COMPANY IDENTIFICATION

**A Product Name** Hafnium Tetrachloride

**Synonyms** Hafnium Tetrachloride: Hafnium Chloride (Product #405)

**Product Code** SAC027

**UN/ID No.** 3260

**B Recommended Use** Chemical intermediate

**Uses advised against**

**C Supplier**

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

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

## Section 2: HAZARDS IDENTIFICATION

**A GHS - Classification**

| | |
|---|---|
| Skin corrosion/irritation | Category 1B |
| Corrosive to metals | Category 1 |

**B Label elements**

**Emergency Overview**

**Signal word** Danger

**Hazard statements**
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
• Do not breathe dust/fume

**Precautionary Statements - Response**
• IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
• IF exposed: Call a POISON CENTER or doctor/physician
• IF ON SKIN (or hair): 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
• 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

**C Other Information**

Other hazards Harmful if swallowed

**Hazards not otherwise classified (HNOC)**

Reacts violently with water • (EUH014)

## Section 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 |

## Section 4: FIRST AID MEASURES

**A Eye contact** Flush with water for 15 minutes. See a physician

**B Skin Contact** Brush off loose particles from skin Remove/Take off immediately all contaminated clothing Rinse skin with water/shower

**C 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.

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

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

**F. Indication of immediate medical attention and special treatment needed, if necessary** Treat symptomatically.

## Section 5: FIRE FIGHTING MEASURES

**A Suitable extinguishing media** Non-combustible

**Unsuitable extinguishing media** Non-combustible. 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** Non-combustible

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

**C Special protective equipment for fire-fighters** Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

## Section 6: ACCIDENTAL RELEASE MEASURES

**A Personal precautions** Use personal protective equipment as required.

**For emergency responders** Use personal protective equipment as required. Follow Emergency Response Guidebook, Guide No. 154.

**B Environmental precautions** Collect spillage to prevent release to the environment

**C. 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.

## Section 7: HANDLING AND STORAGE

**A 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

**B 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.

## Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**A Control parameters**

| Chemical Name | Korea |
|---|---|
| Hafnium Tetrachloride | - |
| Zirconium Tetrachloride | STEL: 10 mg/m$^3$<br>TWA: 5 mg/m$^3$ |

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

**C 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

**Information on basic physical and chemical properties**

**A Physical state** Solid

**Appearance** Powder **Color** white, orange

**B Odor** Pungent, Slight chlorine.

**C Odor threshold**

| Property | Values | Remarks • Method |
|---|---|---|
| **D pH** | <1 | |
| **E Melting point / freezing point** | 320 °C / 610 °F | |
| **F Boiling point / boiling range** | - | |
| **G Flash point** | - | Not applicable |
| **H Evaporation rate** | - | Not applicable |
| **I Flammability (solid, gas)** | - | Not flammable |
| **J Flammability Limit in Air** | | |
| **Upper flammability limit:** | | - |
| **Lower flammability limit:** | | - |
| **K Vapor pressure** | - | Not applicable |
| **L Solubility(ies)** | | |
| **Water solubility** | Reacts with water, hydrolyzes | |
| **Solubility in other solvents** | | |
| **M Vapor density** | - | Not applicable |
| **N Specific Gravity** | 2.8 | |
| **O. Partition coefficient** | - | |
| **P. Autoignition temperature** | - | Not applicable |
| **Q. Decomposition temperature** | - | Not applicable |
| **R Kinematic viscosity** | - | Not applicable |
| **Dynamic viscosity** | - | Not applicable |
| **S. Molecular weight** | 320.30 of Hafnium Tetrachloride | |

**Other Information**

| | |
|---|---|
| **Explosive properties** | Not applicable |
| **Oxidizing properties** | Not applicable |
| **Softening point** | - |
| **VOC Content (%)** | Not applicable |
| **Density** | - |
| **Bulk density** | 110-130lb/ft3 |

## Section 10: STABILITY AND REACTIVITY

**A Stability** Stable under normal conditions

Explosion data

| | |
|---|---|
| Sensitivity to Mechanical Impact | None. |
| Sensitivity to Static Discharge | None. |

**B Possibility of Hazardous Reactions** Reacts with water

**Hazardous polymerization** Hazardous polymerization does not occur

**C Conditions to avoid** Dust formation and dust accumulation. Unintentional contact with water

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

**E Hazardous Decomposition Products** Reacts with water to produce hydrogen chloride gas or hydrochloric acid and heat.

## Section 11: TOXICOLOGICAL INFORMATION

**A Information on likely routes of exposure**

| | |
|---|---|
| **Inhalation** | Product not classified. |
| **Ingestion** | Harmful if swallowed. |
| **Eye contact** | Causes severe eye damage. |

**Skin Contact** Causes severe skin burns.

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

**Skin corrosion/irritation** Causes severe skin burns.
**Serious eye damage/eye irritation** Causes severe eye damage.
**Sensitization** Product not classified
**Carcinogenicity** Product not classified
**Germ cell mutagenicity** Product not classified
**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

**C Numerical measures of toxicity**

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

**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.

## Section 12: ECOLOGICAL INFORMATION

**A Ecotoxicity**

This product as shipped is not classified for aquatic toxicity.

| Chemical Name | Algae/aquatic plants | Fish | Toxicity to microorganisms | Crustacea |
|---|---|---|---|---|
| Hafnium Tetrachloride | *The 72 h EC50 of Hafnium dioxide in water to Pseudokirchneriella subcapitata was greater than the solubility limit of 0.008 mg Hf/L .* | *The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg Hf/L .* | | *The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg Hf/L.* |
| Zirconium Tetrachloride | *The 14 d NOEC of zirconium tetrachloride to Chlorella vulgaris was greater than 262 mg of ZrCl4/L.* | *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* | - | *The 48 h EC50 of zirconium tetrachloride to Daphnia magna was greater than 190 mg of ZrCl4/L.* |

**B Persistence and degradability**

**C Bioaccumulation**

**D Mobility**

**E Other adverse effects**

## Section 13: DISPOSAL CONSIDERATIONS

**A Waste from residues/unused products** Disposal should be in accordance with applicable regional, national and local laws and regulations

**B Contaminated packaging** Disposal should be in accordance with applicable regional, national and local laws and regulations

## Section 14: TRANSPORT INFORMATION

**A UN/ID No.** 3260
**B Proper shipping name** Corrosive solid, acidic, inorganic, n.o.s. (Hafnium Tetrachloride)
**C Hazard Class** 8
**D Packing Group** II
**E Marine pollutant** Not regulated **Special Provisions** IB8, IP2, IP4, T3, TP33

## Section 15: REGULATORY INFORMATION

**A Industrial Safety and Health Law** Not applicable

| Chemical Name | ISHA - Harmful Substances Prohibited for Manufacturing, Importing, Transferring, or Supplying | Korea. Harmful Substances Requiring Permission | ISHA - Substances to be controlled - Organic Substances | ISHA - Substances to be controlled - Metals | ISHA - Substances to be controlled - Acids and bases |
|---|---|---|---|---|---|
| Hafnium Tetrachloride | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| Zirconium Tetrachloride | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |

**B Toxic Chemicals Control Law** Not applicable

| Chemical Name | Toxic Chemical Classification Listing (TCCL) - Toxic Chemicals | Toxic Chemicals Control Law - Banned and/or restricted | Toxic Chemicals Control Law - Restrictions on use |
|---|---|---|---|
| Hafnium Tetrachloride | Not applicable | Not applicable | Not applicable |
| Zirconium Tetrachloride | Not applicable | Not applicable | Not applicable |

**C Dangerous Material Safety Control** Not applicable

**D Wastes Management** Dispose of in accordance with federal, state and local regulations

**E Other Regulations**

| Chemical Name | Toxic Release Inventory Chemicals - Group 1 | Toxic Release Inventory Chemicals - Group 2 |
|---|---|---|
| Hafnium Tetrachloride | Not applicable | Not applicable |
| Zirconium Tetrachloride | Not applicable | Not applicable |

**International Inventories**

**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

## Section 16: OTHER INFORMATION

**A Prepared By**

**B Issue Date** 08-Jul-2015

**C Revision Date** 23-Feb-2021
**Version** 6
**Revision Note** SDS sections updated: 1, 10, 14

**D Other Information**

**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