



SAFETY DATA SHEET

Issue Date 08-Dec-2017

Revision Date 19-May-2020

Version 2

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

Product identifier

Product Name Hafnium Oxychloride Powder

Other means of identification

Product Code SAC039

UN/ID No. 3260

Synonyms Hafnium Oxychloride Powder; Hafnium Chloride Oxide Powder, Hafnium Dichloride Oxide Powder, Hafnium Dichloride Monoxide Powder, (Product #413)

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 |
| Serious eye damage/eye irritation | Category 1 |
| 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
Causes serious eye damage



Appearance Crystalline Powder

Physical state Solid

Odor Pungent, Slight chlorine

Precautionary Statements - Prevention

Do not breathe dust/fume
Wear protective gloves/protective clothing/eye protection

Precautionary Statements - Response

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. 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 IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
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 Oxychloride Powder: Hafnium Chloride Oxide Powder, Hafnium Dichloride Oxide Powder, Hafnium Dichloride Monoxide Powder, (Product #413).

| Chemical Name | CAS No. | Weight-% |
|----------------------------|------------|----------|
| Hafnium Dichloride Oxide | 13759-17-6 | 97->99 |
| Zirconium Dichloride Oxide | 7699-43-6 | 0 - 3 |

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 Non-combustible. 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 Reacts with metals to produce heat and corrosive gases. Water, alcohols, phenols, and amines. Rubber, coatings, and some plastics.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

| Chemical Name | ACGIH TLV | OSHA PEL |
|---------------|-----------|----------|
| | | |

| | | |
|---|--|--|
| Hafnium Dichloride Oxide 13759-17-6 | - | - |
| Zirconium Dichloride Oxide 7699-43-6 | STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ Zr | TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ 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

| | | | |
|---------------------------------------|--------------------|-------------------------|--------------------------|
| Physical state | Solid | Odor | Pungent, Slight chlorine |
| Appearance | Crystalline Powder | Odor threshold | - |
| Color | white | | |
| Property | Values | Remarks • Method | |
| pH | <1 | | |
| Melting point / freezing point | - °C / - °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: | - | | |
| Vapor pressure | - | | Not applicable |
| Vapor density | - | | Not applicable |
| Specific Gravity | 2.2 | | |
| Water solubility | 1080 g/L | | |
| Solubility in other solvents | - | | |
| Partition coefficient | - | | |
| Autoignition temperature | - | | Not applicable |
| Decomposition temperature | 200°C/392°F | | |
| Kinematic viscosity | - | | Not applicable |
| Dynamic viscosity | - | | Not applicable |
| Explosive properties | Not applicable | | |
| Oxidizing properties | Not applicable | | |
| Other Information | | | |
| Softening point | - | | |
| Molecular weight | - | | |
| VOC Content (%) | Not applicable | | |

Density -
Bulk density 50-60 lb/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

Dust formation and dust accumulation. Unintentional contact with water.

Incompatible materials

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

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 Dichloride Oxide 13759-17-6 | 3500 mg/kg bw | - | - |
| Zirconium Dichloride Oxide 7699-43-6 | 3500 mg/kg bw | - | - |

Information on toxicological effects

Symptoms May cause skin burns. May cause burning sensation or redness in the eyes. May cause severe upper respiratory irritation if inhaled. May cause acute gastrointestinal effects if swallowed.

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 Dichloride Oxide 13759-17-6 | - | - | - | - |
| Zirconium Dichloride Oxide 7699-43-6 | The 72 h EC50 of zirconium dichloride oxide to <i>Pseudokirchnerella subcapitata</i> was 80% v/v saturated solution. | The 96 h LC50 of zirconium dioxide to <i>Danio rerio</i> was greater than 100 mg/L. | The 3 h EC50 of anhydrous zirconium acetate for activated sludge was greater than 1000 mg/L. | The 48 h EC50 of zirconium dichloride oxide to <i>Daphnia magna</i> was greater than 100% v/v saturated solution. |

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

| | |
|--|--|
| DOT | Regulated |
| UN/ID No. | 3260 |
| Proper shipping name | Corrosive solid, acidic, inorganic, n.o.s. (Hafnium Oxychloride) |
| Hazard Class | 8 |
| Packing Group | II |
| Special Provisions | IB8, IP2, IP4, T3, TP33 |
| Emergency Response Guide Number | 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 does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

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 Dichloride Oxide 7699-43-6 | | X | |

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

| | | | | |
|-----------------------------------|-------------------------|---------------------------|---------------------------|---|
| NFPA | Health hazards 1 | Flammability 0 | Instability 1 | Physical and Chemical Properties - Personal protection X |
| HMIS | Health hazards 2 | Flammability 0 | Physical hazards 1 | |
| Chronic Hazard Star Legend | | * = Chronic Health Hazard | | |

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Revision Note

SDS sections updated: 1, 2, 5, 6, 7, 9, 11, 14, 15

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