



SAFETY DATA SHEET

Issue Date 08-Jul-2015

Revision Date 15-Jan-2018

Version ' '

Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Code SAC027
Product Name Hafnium Tetrachloride

UN/ID no 1759
Synonyms Hafnium Tetrachloride; Hafnium Chloride, (Product #405)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Hafnium Compounds

Uses advised against

1.3. Details of the supplier of the safety data sheet

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

-

1.4. Emergency telephone number

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

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

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

2.2. Label elements

Emergency Overview

Danger

Hazard statements

May be corrosive to metals
Causes severe skin burns and eye damage



Appearance Powder

Physical state Solid

Odour 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 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 corrosive resistant container

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

2.3 Hazards not otherwise classified (HNOC)

Not applicable

Other Information

.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances**Synonyms**

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

Chemical Name	EC No	CAS No	Weight-%
Hafnium Tetrachloride	236-826-5	13499-05-3	>95
Zirconium Tetrachloride	233-058-2	10026-11-6	<4

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures**Inhalation**

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

4.2. 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.

4.3. Indication of any immediate medical attention and special treatment needed**Note to doctors**

Treat symptomatically.

Section 5: FIRE FIGHTING MEASURES

5.1. Extinguishing media

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

5.2. Special hazards arising from the substance or mixture

Non-combustible

Hazardous combustion products Not applicable.

5.3. Advice for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. 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. 137.

6.2. Environmental precautions

Collect spillage to prevent release to the environment.

6.3. 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.

6.4. Reference to other sections

See Section 12: ECOLOGICAL INFORMATION.

Section 7: HANDLING AND STORAGE

7.1. 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.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions

Keep in properly labelled 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.

7.3. Specific end use(s)

Risk Management Methods (RMM)

The information required is contained in this Safety Data Sheet.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Chemical Name	European Union	United Kingdom	France	Spain	Germany
Hafnium Tetrachloride 13499-05-3	-	-	-	TWA: 0.5 mg/m ³	-
Zirconium Tetrachloride 10026-11-6	-	TWA: 5 mg/m ³	-	STEL: 10 mg/m ³ TWA: 5 mg/m ³	-
Chemical Name	Italy	Portugal	Netherlands	Finland	Denmark
Hafnium Tetrachloride 13499-05-3	-	TWA: 0.5 mg/m ³	-	TWA: 0.5 mg/m ³	-
Zirconium Tetrachloride 10026-11-6	-	STEL: 10 mg/m ³ TWA: 5 mg/m ³	-	TWA: 1 mg/m ³	TWA: 5 mg/m ³
Chemical Name	Austria	Switzerland	Poland	Norway	Ireland
Hafnium Tetrachloride 13499-05-3	TWA: 0.5 mg/m ³	-	TWA: 0.5 mg/m ³	-	-
Zirconium Tetrachloride 10026-11-6	TWA: 5 mg/m ³	TWA: 5 mg/m ³	STEL: 10 mg/m ³ TWA: 5 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³	TWA: 5 mg/m ³ STEL: 10 mg/m ³

Derived No Effect Level (DNEL)

Inhalation 8 mg/m³

Predicted No Effect Concentration (PNEC) No information available for this product as a whole.

8.2. Exposure controls

Engineering Controls

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

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 contaminate concentrations. Respiratory protection must be provided in accordance with current local regulations.

Environmental exposure controls Section 6: ACCIDENTAL RELEASE MEASURES.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state Solid

Appearance	Powder	Odour	Pungent, Slight chlorine.
Colour	white, orange	Odour threshold	
Property	Values	Remarks • Method	
pH	<1		
Melting point/freezing point	320 °C / 610 °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	-		
Vapour pressure	-	Not applicable	
Vapour density	-	Not applicable	
Specific Gravity	2.8		
Water solubility	Reacts with water	hydrolyzes	
Solubility(ies)			
Partition coefficient	-		
Autoignition temperature	-	Not applicable	
Decomposition temperature	-	Not applicable	
Kinematic viscosity	-	Not applicable	
Dynamic viscosity	-	Not applicable	
Explosive properties	Not applicable		
Oxidising properties	Not applicable		
9.2. Other information			
Softening point	-		
Molecular weight	320.30		
VOC Content (%)	Not applicable		
Density	-		
Bulk density	110-130lb/ft3		

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Reacts with water .

10.2. Chemical stability

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

10.3. Possibility of hazardous reactions

Hazardous polymerisation

Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions

Reacts with water.

10.4. Conditions to avoid

Unintentional contact with water.

10.5. Incompatible materials

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

gases.

10.6. Hazardous decomposition products

Reacts with water to produce hydrogen chloride gas or hydrochloric acid and heat.

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

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	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.

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

Acute toxicity	Product not classified.
Skin corrosion/irritation	May cause severe skin burns.
Serious eye damage/eye irritation	May cause serious eye damage.
Sensitisation	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.
Target Organ Effects	Product not classified.
Aspiration hazard	Product not classified.

Section 12: ECOLOGICAL INFORMATION

12.1. Toxicity

This product as shipped is not classified for aquatic toxicity

Chemical Name	Algae/aquatic plants	Fish	Toxicity to Micro-organisms	Crustacea
Hafnium Tetrachloride	The 72 h EC50 of Hafnium dioxide in water to Pseudokirchneriella subcapitata was greater	The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg	-	The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg

	than the solubility limit of 0.008 mg Hf/L .	Hf/L .		Hf/L.
Zirconium Tetrachloride	The 14 d NOEC of zirconium tetrachloride to <i>Chlorella vulgaris</i> was greater than 262 mg of ZrCl ₄ /L.	The 96h LC50 value of zirconium tetrachloride to <i>Oncorhynchus mykiss</i> was greater than 51 mg ZrCl ₄ /L and the 96 h LL50 of zirconium tetrachloride to <i>Danio rerio</i> was greater than 190 mg of ZrCl ₄ /L.	-	The 48 h EC50 of zirconium tetrachloride to <i>Daphnia magna</i> was greater than 190 mg of ZrCl ₄ /L.

12.2. Persistence and degradability**12.3. Bioaccumulative potential**

Bioconcentration factor (BCF) -

12.4. Mobility in soil

Mobility

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria do not apply to inorganic substances.

12.6. Other adverse effects**Section 13: DISPOSAL CONSIDERATIONS****13.1. Waste treatment methods**

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**

14.1 UN/ID no	1759
14.2 Proper shipping name	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
14.3 Hazard Class	8
14.4 Packing Group	III
14.5 Marine pollutant	Not applicable
14.6 Special Provisions	128, IB8, IP3, T1, TP33
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable

RID

14.1 UN/ID no	1759
14.2 Proper shipping name	Corrosive solid, n.o.s. (Hafnium Tetrachloride)
14.3 Hazard Class	8

14.4 Packing Group III
 14.5 Environmental hazard Not applicable
 14.6 Special Provisions 128, IB8, IP3, T1, TP33

ADR

14.1 UN/ID no 1759
 14.2 Proper shipping name Corrosive solid, n.o.s. (Hafnium Tetrachloride)
 14.3 Hazard Class 8
 14.4 Packing Group III
 14.5 Environmental hazard Not applicable
 14.6 Special Provisions 128, IB8, IP3, T1, TP33

ICAO (air)

14.1 UN/ID no 1759
 14.2 Proper shipping name Corrosive solid, n.o.s. (Hafnium Tetrachloride)
 14.3 Hazard Class 8
 14.4 Packing Group III
 14.5 Environmental hazard Not applicable
 14.6 Special Provisions 128, IB8, IP3, T1, TP33

IATA

14.1 UN/ID no 1759
 14.2 Proper shipping name Corrosive solid, n.o.s. (Hafnium Tetrachloride)
 14.3 Hazard Class 8
 14.4 Packing Group III
 Description .
 14.5 Environmental hazard Not applicable
 14.6 Special Provisions 128, IB8, IP3, T1, TP33 137
ERG Code

Section 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Name	French RG number	Title
Hafnium Tetrachloride 13499-05-3	-	-
Zirconium Tetrachloride 10026-11-6	-	-

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work

Authorisations and/or restrictions on use:

This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV). This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII).

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

15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

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.

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Note:

The information provided in this Material 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