



PRODUCT INFORMATION SHEET

MATERION

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Name of the substance Hafnium powder
Identification number 231-166-4 (EC number)
Registration number -
Document number 1KK
Synonyms HAFNIUM, ELEMENTAL
Materion Code 1KK
Issue date 20-August-2013
Revision date 30-August-2018
Supersedes date 22-February-2018
Version number 07

1.3. Details of the supplier of the product information sheet

Supplier

Company name Materion Advanced Chemicals Inc.
Address 407 N. 13th Street
1316 W. St. Paul Avenue
Milwaukee, WI 53233
United States
Division Milwaukee
Telephone 414.212.0257
e-mail advancedmaterials@materion.com
Contact person Laura Hamilton

1.4. Emergency telephone number

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

Identified uses Not available.
Uses advised against None known.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended

Physical hazards

Self-heating substances and mixtures Category 1

Hazard summary

DANGER

HIGHLY FLAMMABLE SOLID.

May cause respiratory irritation. High concentrations of dust may form explosive mixture with air.
Causes eye irritation. Causes skin irritation.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Hafnium

Hazard pictograms



Signal word Danger

Hazard statements

H228 Flammable solid.
H250 Catches fire spontaneously if exposed to air.

Precautionary statements

Prevention

P210	Minimise dust generation and accumulation.
P232	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P240	Protect from moisture.
P241	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/eye protection/face protection.

Response

P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314	Get medical advice/attention if you feel unwell.
P370 + P378	In case of fire: Use appropriate media to extinguish.

Storage

P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P422	Store contents under appropriate liquid or inert gas.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.
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Supplemental label information

EUH209A - Can become flammable in use.

2.3. Other hazards

None known.

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Hafnium	100	7440-58-6 231-166-4	-	-	
Classification:	Flam. Sol. 1;H228, Pyr. Sol. 1;H250				

List of abbreviations and symbols that may be used above

DSD: Directive 67/548/EEC.

CLP: Regulation No. 1272/2008.

#: This substance has been assigned Union workplace exposure limit(s).

#: This substance has been assigned Community workplace exposure limit(s).

M: M-factor

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

General information

If you feel unwell, seek medical advice (show the label where possible).

4.1. Description of first aid measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Skin contact

Wash off with warm water and soap. Get medical attention if irritation develops and persists.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion

Rinse mouth thoroughly. Get medical advice/attention if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Irritant effects.

4.3. Indication of any immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards

Flammable solid. Catches fire spontaneously if exposed to air.

Material name: Hafnium powder

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5.1. Extinguishing media	
Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
5.2. Special hazards arising from the substance or mixture	Spontaneously flammable in air. During fire, gases hazardous to health may be formed.
5.3. Advice for firefighters	
Special protective equipment for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Special firefighting procedures	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Self-contained breathing apparatus and full protective clothing must be worn in case of fire. In the event of fire and/or explosion do not breathe fumes.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Keep unnecessary personnel away. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Ventilate closed spaces before entering them.
For emergency responders	Not available.

6.2. Environmental precautions Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Use only non-sparking tools. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Sweep up or vacuum up spillage and collect in suitable container for disposal.

6.4. Reference to other sections Not available.

SECTION 7: Handling and storage

7.1. Precautions for safe handling Open container carefully and only in a dry, oxygen-free or inert atmosphere. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Explosion-proof general and local exhaust ventilation. Wear appropriate personal protective equipment. Avoid generation and spreading of dust. Dust clouds may be explosive under certain conditions. Flammable/combustible - Keep away from oxidisers, heat and flames.

7.2. Conditions for safe storage, including any incompatibilities Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Keep container tightly closed and dry. Keep container in a well-ventilated place.

7.3. Specific end use(s) Not available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001

Material	Type	Value	Form
Hafnium (CAS 7440-58-6)	MAK	0,5 mg/m ³	Inhalable fraction.
	STEL	5 mg/m ³	Inhalable fraction.

Belgium. Exposure Limit Values.

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

Denmark. Exposure Limit Values

Material	Type	Value	Form
Hafnium (CAS 7440-58-6)	TLV	0,5 mg/m ³	Dust.

Finland. Workplace Exposure Limits

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

France. Threshold Limit Values (VLEP) for Occupational Exposure to Chemicals in France, INRS ED 984

Material	Type	Value
Hafnium (CAS 7440-58-6)	VME	0,5 mg/m ³

Regulatory status: Indicative limit (VL)

Greece. OELs (Decree No. 90/1999, as amended)

Material	Type	Value
Hafnium (CAS 7440-58-6)	STEL	1,5 mg/m ³
	TWA	0,5 mg/m ³

Iceland. OELs. Regulation 154/1999 on occupational exposure limits

Material	Type	Value	Form
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³	Dust.

Ireland. Occupational Exposure Limits

Material	Type	Value
Hafnium (CAS 7440-58-6)	STEL	1,5 mg/m ³
	TWA	0,5 mg/m ³

Italy. Occupational Exposure Limits

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

Norway. Administrative Norms for Contaminants in the Workplace

Material	Type	Value
Hafnium (CAS 7440-58-6)	TLV	0,5 mg/m ³

Ordinance of the Minister of Labour and Social Policy on 6 June 2014 on the maximum permissible concentrations and intensities of harmful health factors in the work environment, Journal of Laws 2014, item 817

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

Romania. OELs. Protection of workers from exposure to chemical agents at the workplace

Material	Type	Value
Hafnium (CAS 7440-58-6)	STEL	0,5 mg/m ³
	TWA	0,2 mg/m ³

Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)

Material	Type	Value	Form
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³	Inhalable fraction.

Spain. Occupational Exposure Limits

Material	Type	Value
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³

Switzerland. SUVA Grenzwerte am Arbeitsplatz

Material	Type	Value	Form
Hafnium (CAS 7440-58-6)	TWA	0,5 mg/m ³	Inhalable dust.

Biological limit values No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures Follow standard monitoring procedures.

Derived no effect levels (DNELs) Not available.

Predicted no effect concentrations (PNECs)	Not available.
8.2. Exposure controls	
Appropriate engineering controls	Ventilate as needed to control airborne dust. Use explosion-proof ventilation equipment if airborne dust levels are high.
Individual protection measures, such as personal protective equipment	
General information	Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
Eye/face protection	Wear safety glasses with side shields (or goggles).
Skin protection	
- Hand protection	Wear appropriate chemical resistant gloves.
- Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Not available.
Hygiene measures	Do not breathe dust. Do not get in eyes, on skin, on clothing.
Environmental exposure controls	Environmental manager must be informed of all major releases.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state	Solid.
Form	Powder.
Colour	Not available.
Odour	Not available.
Odour threshold	Not available.
pH	Not available.
Melting point/freezing point	2233 °C (4051,4 °F)
Initial boiling point and boiling range	4603 °C (8317,4 °F)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Flammable solid.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	< 0,0000001 kPa at 25 °C
Vapour density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	20 °C (68 °F)
Decomposition temperature	Not available.
Viscosity	Not available.
Explosive properties	Not explosive.
Oxidising properties	Not available.
9.2. Other information	
Density	13,31 g/cm ³ estimated
Molecular formula	Hf
Molecular weight	178,49 g/mol

Specific gravity 13,31

SECTION 10: Stability and reactivity

10.1. Reactivity	Keep away from combustible material. May form explosive mixtures with air.
10.2. Chemical stability	Risk of ignition.
10.3. Possibility of hazardous reactions	Not available.
10.4. Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Contact with incompatible materials. Exposure to air.
10.5. Incompatible materials	Strong oxidising agents. Chlorine. Combustible material. Air.
10.6. Hazardous decomposition products	Metal oxides.

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Dust or powder may irritate the skin.
Eye contact	May be irritating to eyes.
Ingestion	Due to lack of data the classification is not possible.

Symptoms Irritating to eyes, respiratory system and skin.

11.1. Information on toxicological effects

Acute toxicity	Not known. Irritating and may cause redness and pain. May cause irritation to the respiratory system.
Skin corrosion/irritation	Due to partial or complete lack of data the classification is not possible.
Serious eye damage/eye irritation	May cause eye irritation. Due to partial or complete lack of data the classification is not possible.
Respiratory sensitisation	Due to partial or complete lack of data the classification is not possible.
Skin sensitisation	Due to partial or complete lack of data the classification is not possible. May irritate and cause redness and pain.
Germ cell mutagenicity	Due to partial or complete lack of data the classification is not possible.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)	Not listed.
Reproductive toxicity	Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - single exposure	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	May cause damage to organs (respiratory system) through prolonged or repeated exposure. Due to partial or complete lack of data the classification is not possible.
Aspiration hazard	Due to partial or complete lack of data the classification is not possible.
Mixture versus substance information	No information available.
Other information	Not available.

SECTION 12: Ecological information

12.1. Toxicity	Due to partial or complete lack of data the classification for hazardous to the aquatic environment, is not possible.
12.2. Persistence and degradability	No data is available on the degradability of this product.
12.3. Bioaccumulative potential	No data available.
Partition coefficient n-octanol/water (log Kow)	Not available.
Bioconcentration factor (BCF)	Not available.
12.4. Mobility in soil	No data available.
12.5. Results of PBT and vPvB assessment	Not a PBT or vPvB substance or mixture.

12.6. Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Consult authorities before disposal. Dispose of contents/container in accordance with local/regional/national/international regulations.
Special precautions	Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. UN number	UN2545
14.2. UN proper shipping name	Hafnium powder, dry
14.3. Transport hazard class(es)	
Class	4.2
Subsidiary risk	-
Label(s)	4.2
Hazard No. (ADR)	Not available.
Tunnel restriction code	Not available.
14.4. Packing group	II
14.5. Environmental hazards	No.
14.6. Special precautions for user	Not available.

RID

14.1. UN number	UN2545
14.2. UN proper shipping name	HAFNIUM POWDER, DRY
14.3. Transport hazard class(es)	
Class	4.2
Subsidiary risk	-
Label(s)	4.2
14.4. Packing group	II
14.5. Environmental hazards	No.
14.6. Special precautions for user	Not available.

ADN

14.1. UN number	UN2545
14.2. UN proper shipping name	Hafnium powder, dry
14.3. Transport hazard class(es)	
Class	4.2
Subsidiary risk	-
Label(s)	4.2
14.4. Packing group	II
14.5. Environmental hazards	No.
14.6. Special precautions for user	Not available.

IATA

14.1. UN number	UN2545
14.2. UN proper shipping name	Hafnium powder, dry

14.3. Transport hazard class(es)

Class 4.2

Subsidiary risk -

14.4. Packing group II

14.5. Environmental hazards No.

ERG Code 4L

14.6. Special precautions for user Not available.

Other information

Passenger and cargo aircraft Allowed with restrictions.

Cargo aircraft only Allowed with restrictions.

IMDG

14.1. UN number UN2545

14.2. UN proper shipping name HAFNIUM POWDER, DRY

14.3. Transport hazard class(es)

Class 4.2

Subsidiary risk -

14.4. Packing group II

14.5. Environmental hazards

Marine pollutant No.

EmS F-G, S-M

14.6. Special precautions for user Not available.

ADN; ADR; IATA; IMDG; RID

**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU regulations****Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended**

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

The product does not need to be labelled in accordance with EC directives or respective national laws. The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended.

National regulations

Follow national regulation for work with chemical agents.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

Not available.

References

ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents

Training information

Follow training instructions when handling this material.

Disclaimer

Materion Advanced Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. To avoid any misunderstandings or incorrect assumptions by the receiver of the safety information, it should be made clear that the supplied information is not in the form of a Safety Data Sheet (SDS), but is actually a voluntary Product Information Sheet closely following the guidelines of the Safety Data Sheet – COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010 (REACH/SDS).