



## MATERION

### 1. Chemical and company identification

Name of chemical (Product name) **Metallized Beryllia Ceramic**

Supplier's company name, address and phone number  
Materion Brush Inc.  
6070 Parkland Boulevard  
Mayfield Heights, OH 44124  
United States  
ehs@materion.com  
www.materion.com  
+1.216.383.4019

Reference number C11

### 2. Hazards identification

#### GHS classification

**Physical hazards** The product is not classified according to GHS.  
**Health hazards**  
Sensitization, respiratory Category 1  
Sensitization, skin Category 1  
Germ cell mutagenicity Category 2  
Carcinogenicity Category 1  
Specific target organ toxicity, single exposure Category 3 respiratory tract irritation  
Specific target organ toxicity, repeated exposure Category 1 (respiratory system)

**Environmental hazards** The product is not classified according to GHS.

#### GHS label elements

##### Pictograms



##### Signal words

Danger

##### Hazard statement

May cause cancer by inhalation. May cause an allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs (respiratory system) through prolonged or repeated exposure.

#### Precautionary statement

##### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Do not breathe dust/fume. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection. In case of inadequate ventilation wear respiratory protection.

##### Response

If on skin: Wash with plenty of water. If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a poison center/doctor. Wash contaminated clothing before reuse.

##### Storage

Store locked up.

##### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

#### Other hazards which do not result in classification

None known.

#### Supplemental information

For further information, please contact the Product Stewardship Department at +1.216.383.4019.

## Main symptoms and emergency overview

**Main symptoms** Discomfort in the chest. Shortness of breath. Coughing. Edema. Liver enlargement. Jaundice. Proteinuria. Irritating to mouth, throat, and stomach. Skin irritation. Rash. Sensitization. Prolonged exposure may cause chronic effects.

**Emergency overview** DANGER

Fatal if inhaled. Very toxic. Harmful if absorbed through skin. Harmful in contact with eyes. Cancer hazard. May cause an allergic skin reaction. May cause sensitization by inhalation and skin contact. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Possible reproductive hazard. Causes damage to organs. Danger of serious damage to health by prolonged exposure. Dangerous for the environment if discharged into watercourses.

## 3. Composition/information on ingredients

**Substance or mixture** Mixture

Components	CAS Number	Gazette notification		Concentration (%)
		ENCS no.	ISHL no.	
Molybdenum	7439-98-7			0 - 10
Nickel	7440-02-0			0 - 10
Silica	14808-60-7	(1)-548	(1)-548	0 - 4
Manganese	7439-96-5			0 - 2
Titanium	7440-32-6			0 - 2
Tungsten	7440-33-7			0 - 2
Gold	7440-57-5			0 - 1

**Synonym(s)** Beryllium Oxide, Berylla, Thermalox, Thermolox 995, BW1000, BW 3250, BWTF, Durox - CR

**Chemical formula** Mo (7439-98-7), Ni (7440-02-0), O<sub>2</sub>Si (14808-60-7), Mn (7439-96-5), Ti (7440-32-6), W (7440-33-7), Au (7440-57-5)

## 4. First aid measures

**If inhaled** If symptoms develop move victim to fresh air. For breathing difficulties, oxygen may be necessary. Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

**If on skin** Take off contaminated clothing and wash before reuse. Thoroughly wash skin cuts or wounds to remove all particulate debris from the wound. Seek medical attention for wounds that cannot be thoroughly cleansed. Treat skin cuts and wounds with standard first aid practices such as cleansing, disinfecting and covering to prevent wound infection and contamination before continuing work. Obtain medical help for persistent irritation. Material accidentally implanted or lodged under the skin must be removed.

**If in eyes** Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention if symptoms persist.

**If swallowed** If swallowed, seek medical advice immediately and show this container or label. Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

**Most important symptoms/effects, acute and delayed** The beryllium oxide in the product is not known to cause acute health effects. Inhaling particulate containing beryllium oxide can cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals.

**Protection of first-aid responders** If exposed or concerned: get medical attention/advice. Get medical attention if symptoms occur. Wash contaminated clothing before reuse. As supplied, there is no immediate medical risk with beryllium products in article form. First aid measures provided are related to particulate containing beryllium.

## Notes to physician

Treatment of Chronic Beryllium Disease: There is no known treatment which will cure chronic beryllium disease. Prednisone or other corticosteroids are the most specific treatment currently available. They are directed at suppressing the immunological reaction and can be effective in diminishing signs and symptoms of chronic beryllium disease. In cases where steroid therapy has had only partial or minimal effectiveness, other immunosuppressive agents, such as cyclophosphamide, cyclosporine, or methotrexate, have been used. In view of the potential side effects of all the immunosuppressive medications, including steroids such as prednisone, they should be used only under the direct care of a physician. Other treatment, such as oxygen, inhaled steroids or bronchodilators, may be prescribed by some physicians and can be effective in selected cases. In general, treatment is reserved for cases with significant symptoms and/or significant loss of lung function. The decision about when and with what medication to treat is a judgment situation for individual physicians.

In their 2014 official statement on the Diagnosis and Management of Beryllium Sensitivity and Chronic Beryllium Disease, the American Thoracic Society states that "it seems prudent for workers with BeS to avoid all future occupational exposure to beryllium."

The effects of continued low exposure to beryllium are unknown for individuals who are sensitized to beryllium or who have a diagnosis of chronic beryllium disease. It is generally recommended that persons who are sensitized to beryllium or who have CBD terminate their occupational exposure to beryllium.

## 5. Fire-fighting measures

### Extinguishing media

The product is non-combustible. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

### Extinguishing media to avoid

Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions.

### Special fire fighting procedures

Move containers from fire area if you can do so without risk. Water runoff can cause environmental damage.

### Protection of fire-fighters

Firefighters should wear full protective clothing including self contained breathing apparatus. Wear suitable protective equipment.

### Specific methods

Pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the particulate released during or after a fire.

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

In solid form this material poses no special clean-up problems. Wear appropriate protective equipment and clothing during clean-up.

### Environmental precautions

Avoid release to the environment. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

### Methods and materials for containment and cleaning up

Clean up in accordance with all applicable regulations.

## 7. Handling and storage

### Handling

#### Technical measures (e.g. Local and general ventilation)

Not available.

#### Safe handling advice

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Wash thoroughly after handling. When using, do not eat, drink or smoke. Contaminated work clothing must not be allowed out of the workplace.

#### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice.

### Storage

#### Safe storage conditions

Store locked up. Avoid contact with acids and alkalis. Avoid contact with oxidizing agents.

#### Safe packaging materials

Not applicable.

## 8. Exposure controls/personal protection

### Control parameters

**WET METHODS:** Machining operations are usually performed under a liquid lubricant/coolant flood which assists in reducing airborne particulate. However, the cycling through of machine coolant containing finely divided particulate in suspension can result in the concentration building to a point where the particulate may become airborne during use. Certain processes such as sanding and grinding may require complete hooded containment and local exhaust ventilation. Prevent coolant from splashing onto floor areas, external structures or operators' clothing. Utilize a coolant filtering system to remove particulate from the coolant.

**WORK PRACTICES:** Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. If work practices and/or procedures are ineffective in controlling airborne exposure or visual particulate from deposition on skin, hair, or clothing, provide appropriate cleaning/washing facilities. Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker. Never use compressed air to clean work clothing or other surfaces.

Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, clean loose particulate from parts between processing steps. As a standard hygiene practice, wash hands before eating or smoking.

**HOUSEKEEPING:** Use vacuum and wet cleaning methods for particulate removal from surfaces. Be certain to de-energize electrical systems, as necessary, before beginning wet cleaning. Use vacuum cleaners with high efficiency particulate air (HEPA). Do not use compressed air, brooms, or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. Follow the manufacturer's instructions when performing maintenance on HEPA filtered vacuums used to clean hazardous materials.

### Occupational exposure limits

#### Japan. OELs - ISHL. (Workplace Environment Assessment Standards)

Material	Type	Value	Form
Metallized Beryllia Ceramic	TLV	0.001 mg/m <sup>3</sup>	
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Manganese (CAS 7439-96-5)	TLV	0.2 mg/m <sup>3</sup>	
Molybdenum (CAS 7439-98-7)	TLV	0.025 mg/m <sup>3</sup>	Dust.
Nickel (CAS 7440-02-0)	TLV	0.1 mg/m <sup>3</sup>	

#### Japan. OELs - JSOH (Japan Society of Occupational Health: Recommendation of Occupational Exposure Limits)

Material	Type	Value	Form
Metallized Beryllia Ceramic	TWA	0.002 mg/m <sup>3</sup>	
<b>Components</b>	<b>Type</b>	<b>Value</b>	<b>Form</b>
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m <sup>3</sup>	
Molybdenum (CAS 7439-98-7)	TWA	8 mg/m <sup>3</sup>	Total dust.
		2 mg/m <sup>3</sup>	Respirable dust.
Nickel (CAS 7440-02-0)	TWA	1 mg/m <sup>3</sup>	
Silica (CAS 14808-60-7)	Ceiling	0.03 mg/m <sup>3</sup>	Respirable dust.

#### US. ACGIH Threshold Limit Values

Material	Type	Value	Form
Metallized Beryllia Ceramic	TWA	0.00005 mg/m <sup>3</sup>	Inhalable fraction.

**US. ACGIH Threshold Limit Values**

Components	Type	Value	Form
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m <sup>3</sup>	Inhalable fraction.
Molybdenum (CAS 7439-98-7)	TWA	0.02 mg/m <sup>3</sup>	Respirable fraction.
		3 mg/m <sup>3</sup>	Respirable fraction.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m <sup>3</sup>	Inhalable fraction.
Silica (CAS 14808-60-7)	TWA	0.025 mg/m <sup>3</sup>	Respirable fraction.
Tungsten (CAS 7440-33-7)	TWA	3 mg/m <sup>3</sup>	Respirable fraction.

**Engineering measures**

**WET METHODS:** Machining operations are usually performed under a liquid lubricant/coolant flood which assists in reducing airborne particulate. However, the cycling through of machine coolant containing finely divided particulate in suspension can result in the concentration building to a point where the particulate may become airborne during use. Certain processes such as sanding and grinding may require complete hooded containment and local exhaust ventilation. Prevent coolant from splashing onto floor areas, external structures or operators' clothing. Utilize a coolant filtering system to remove particulate from the coolant.

**WORK PRACTICES:** Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. If work practices and/or procedures are ineffective in controlling airborne exposure or visual particulate from deposition on skin, hair, or clothing, provide appropriate cleaning/washing facilities. Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker. Never use compressed air to clean work clothing or other surfaces.

Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, clean loose particulate from parts between processing steps. As a standard hygiene practice, wash hands before eating or smoking.

**HOUSEKEEPING:** Use vacuum and wet cleaning methods for particulate removal from surfaces. Be certain to de-energize electrical systems, as necessary, before beginning wet cleaning. Use vacuum cleaners with high efficiency particulate air (HEPA). Do not use compressed air, brooms, or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. Follow the manufacturer's instructions when performing maintenance on HEPA filtered vacuums used to clean hazardous materials.

**Personal protective equipment****Respiratory protection**

When airborne exposures exceed or have the potential to exceed the occupational exposure limits, approved respirators must be used as specified by an Industrial Hygienist or other qualified professional. Respirator users must be medically evaluated to determine if they are physically capable of wearing a respirator. Quantitative and/or qualitative fit testing and respirator training must be satisfactorily completed by all personnel prior to respirator use. Users of tight fitting respirators must be clean shaven on those areas of the face where the respirator seal contacts the face. Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air cleaning device.

**Hand protection**

Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.

**Eye protection**

Wear approved safety glasses, goggles, face shield and/or welder's helmet when risk of eye injury is present, particularly during operations that generate dust, mist or fume.

**Skin and body protection**

Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities. Skin contact with this material may cause, in some sensitive individuals, an allergic dermal response. Particulate that becomes lodged under the skin has the potential to induce sensitization and skin lesions.

## 9. Physical and chemical properties

Physical state	Solid.
Form	Various shapes.
Color	White.
Odor	Not applicable.
Odor threshold	Not applicable.
Melting point/freezing point	4586 °F (2530 °C) 1948.57 °F (1064.76 °C) estimated
Boiling point, initial boiling point, and boiling range	7052 °F (3900 °C)  3741.8 °F (2061 °C) estimated
Combustibility	Not applicable.
Lower and upper explosion limit / flammability limit	
Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
Flash point	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not applicable.
pH	Not applicable.
Kinematic viscosity	Not available.
Solubility(ies)	
Solubility (water)	Not applicable.
Partition coefficient (n-octanol/water) (log value)	Not available.
Vapor pressure	6.67 kPa at 25°C estimated
Density and/or relative density	
Density	3.01 g/cm <sup>3</sup> estimated 10.09 g/cm <sup>3</sup> estimated
Relative density	Not applicable.
Vapor density	Not applicable.
Particle characteristics	Not available.
Other information	
Evaporation rate	Not applicable.
Molecular formula	Be-O
Molecular weight	25.01 g/mol
Specific gravity	1.85 estimated
Viscosity (Coefficient of viscosity)	Not applicable.

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

## 11. Toxicological information

<b>Acute toxicity</b>	Not available.
<b>Skin corrosion/irritation</b>	Causes skin irritation.
<b>Serious eye damage/eye irritation</b>	Causes eye irritation.
<b>Respiratory or skin sensitization</b>	
<b>Japan Society for Occupational Health: Respiratory sensitizer</b>	
Nickel (CAS 7440-02-0)	2 Probable respiratory sensitizer.
<b>Japan Society for Occupational Health: Skin sensitizer</b>	
Nickel (CAS 7440-02-0)	1 Known skin sensitizer.
<b>Respiratory sensitization</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
<b>Skin sensitization</b>	May cause an allergic skin reaction.
<b>Germ cell mutagenicity</b>	Due to lack of data the classification is not possible.
<b>Carcinogenicity</b>	Cancer hazard.
<b>ACGIH Carcinogens</b>	
Manganese (CAS 7439-96-5)	A4 Not classifiable as a human carcinogen.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Silica (CAS 14808-60-7)	1 Carcinogenic to humans.
<b>Japan Society for Occupational Health: Carcinogen</b>	
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.
Silica (CAS 14808-60-7)	1 Carcinogenic to humans.
<b>Reproductive toxicity</b>	Not classified.
<b>Specific target organ toxicity - single exposure</b>	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
<b>Specific target organ toxicity - repeated exposure</b>	May cause damage to organs (respiratory system) through prolonged or repeated exposure.
<b>Aspiration hazard</b>	Due to lack of data the classification is not possible.

## 12. Ecological information

### Ecotoxicological data

Product	Species		Test Results
Metallized Beryllia Ceramic			
<b>Aquatic</b>			
Crustacea	EC50	Daphnia	2000 mg/l, 48 hours estimated
Fish	LC50	Fish	897.9192 mg/l, 96 hours estimated

Components	Species		Test Results
Nickel (CAS 7440-02-0)			
<b>Aquatic</b>			
<i>Acute</i>			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.06 mg/l, 4 days

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of this product.
<b>Bioaccumulation</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Hazardous to the ozone layer</b>	No data available.
<b>Other hazardous effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

### 13. Disposal considerations

<b>Residual waste</b>	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).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.
<b>Local disposal regulations</b>	Material should be recycled if possible. Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

### 14. Transport information

#### IATA

Not regulated as dangerous goods.

#### IMDG

Not regulated as dangerous goods.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not available.

**National regulations** Follow regulation in section 15 for domestic transportation.

### 15. Regulatory information

#### Industrial Safety and Health Act

##### Specified substances regulation

###### Class 2 designated chemical substances

MANGANESE AND ITS COMPOUNDS (EXCEPT MANGANESE OXIDE, BASIC)  
NICKEL COMPOUNDS (POWDER, EXCLUDING NICKEL CARBONYL (ITEM NO. 24))

##### Notifiable substances

CRYSTALLINE SILICA	Table 9 Ordinance No. 165-2	0 - 4.0 %
MANGANESE	Table 9 Ordinance No. 550	0 - 2.0 %
MOLYBDENUM AND MOLYBDENUM COMPOUNDS	Table 9 Ordinance No. 603	0 - 10 %
NICKEL	Table 9 Ordinance No. 418	0 - 10 %
TUNGSTEN AND TUNGSTEN COMPOUNDS, WATER-SOLUBLE	Table 9 Ordinance No. 337	0 - 2.0 %

##### Labeling substances

CRYSTALLINE SILICA	0 - 4.0 %
MANGANESE (POWDER)	0 - 2.0 %
MOLYBDENUM (POWDER)	0 - 10 %
MOLYBDENUM AND MOLYBDENUM COMPOUNDS	0 - 10 %
TUNGSTEN (POWDER)	0 - 2.0 %
TUNGSTEN AND TUNGSTEN COMPOUNDS, WATER-SOLUBLE	0 - 2.0 %

#### Poisonous and Deleterious Substances Control Act

##### Specified poisonous substances

Not regulated.

##### Poisonous substances

Not regulated.

##### Deleterious substances

Not regulated.

#### Act on the Regulation of Manufacture and Evaluation of Chemical Substances

##### Class I specified chemical substances

Not regulated.

##### Class II specified chemical substances

Not regulated.

##### Monitoring chemical substances

Not regulated.



**Priority Assessment Chemical Substances (PACs)**

Not regulated.

**Reporting Exempted Substances**

QUARTZ

**Law concerning Pollutant Release and Transfer Register****Specified class 1 substances (substance name, ordinance number and content)**

NICKEL COMPOUNDS Ordinance No. 309 10 % (Nickel)

**Class 1 substances (substance name, ordinance number and content)**

MANGANESE AND ITS COMPOUNDS Ordinance No. 412 2.0 % (Manganese)

MOLYBDENUM AND ITS COMPOUNDS Ordinance No. 453 10 % (Molybdenum)

NICKEL Ordinance No. 308 10 % (Nickel)

**Class 2 substances (substance name, ordinance number and content)**

Not regulated.

**Ship Safety Law, Dangerous Goods Marine Transport and Storage Rule**

Not regulated.

**Air Law, Enforcement Rule**

Not regulated.

**Explosives Control Act**

Not regulated.

**Sewage Act**

MANGANESE AND ITS SOLUBLE COMPOUNDS (AS MN) 10 MG/L

**16. Other information****Further information**

Transportation Emergency  
Call Chemtrec at:  
International: 703.741.5970  
Spain: 900.868.538  
Switzerland: 0800.564.402

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**Revision information**

Hazards identification: Prevention  
Other information: Further information