



MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name	Metallized Beryllia Ceramic
Other means of identification	
SDS number	C11
Synonym(s)	Beryllium Oxide, Beryllia, Thermalox, Thermolox 995, BW1000, BW 3250, BWTF, Durox - CR
B. Recommended use and Limitations on use	
Recommended use	Industrial uses: Uses of substances as such or in preparations at industrial sites Manufacture of computer, electronic and optical products, electrical equipment Scientific research and development
C. Supplier information	
Company name	Materion Brush Inc.
Address	6070 Parkland Boulevard Mayfield Heights OH 44124 United States
Email	ehs@materion.com
Contact person	Theodore Knudson
Emergency telephone number	+1.216.383.4019
MSDS number	C11

2. Hazards identification

A. Hazard category/Classification		
Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2
	Sensitization, skin	Category 1
	Carcinogenicity	Category 1A
	Specific target organ toxicity, repeated exposure	Category 1 (Respiratory system)
Environmental hazards	Not classified.	

B. Warning label items including precautionary statement

• Pictogram



• Signal word

Danger

• Hazard statement

H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
H350i	May cause cancer by inhalation.
H372	Causes damage to organs (respiratory system) through prolonged or repeated exposure by inhalation.

• Precautionary statement

Prevention

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P285 In case of inadequate ventilation wear respiratory protection.

Response

P302 + P350 If on skin: Wash with plenty of water.
P304 + P340 If inhaled: Remove person to fresh air and keep comfortable for breathing.
P308 + P313 If exposed or concerned: Get medical advice/attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P342 + P311 If experiencing respiratory symptoms: Call a poison center/doctor.
P363 Wash contaminated clothing before reuse.

Storage

P405 Store locked up.

Disposal

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

C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard) None known.

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

3. Composition/information on ingredients

Chemical identity	Common and alternative names	CAS number	ID number	Content in percent (%)
Beryllium Oxide		1304-56-9	KE-02840	80 - 97
Molybdenum		7439-98-7	KE-25427	0 - 10
Nickel		7440-02-0	KE-25818	0 - 10
Silica		14808-60-7	KE-29983	0 - 4
Manganese		7439-96-5	KE-22999	0 - 2
Titanium		7440-32-6	KE-33881	0 - 2
Tungsten		7440-33-7	KE-35000	0 - 2
Gold		7440-57-5	KE-18083	0 - 1

4. First aid measures

- A. In case of eye contact** Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention if symptoms persist.
- B. In case of skin contact** 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.
- C. In case of inhalation** 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.
- D. In case of swallowing** 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.

E. Note 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.

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. Inhaling particulate containing beryllium oxide can cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals.

General advice

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.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media

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

Unsuitable extinguishing media

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

B. Specific hazards arising from the chemical (example: hazardous combustion products)

Not available.

C. Specific methods of fire-fighting

Special protective equipment for firefighters

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

Special fire fighting procedures

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

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

A. Personal precautions, protective equipment and emergency measures

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

B. 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.

C. Methods and materials for containment and cleaning up

Clean up in accordance with all applicable regulations.

7. Handling and storage

A. Precautions for safe handling

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. 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.

B. Conditions for safe storage (including any incompatibilities)

Keep locked-up. Avoid contact with acids and alkalis. Avoid contact with oxidizing agents.

8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. OELs. Standards for Exposure to Chemical Substances and Physically Hazardous Factors

Material	Type	Value	
Metallized Beryllia Ceramic	STEL	0.01 mg/m3	
	TWA	0.002 mg/m3	
Components	Type	Value	Form
Beryllium Oxide (CAS 1304-56-9)	STEL	0.01 mg/m3	
	TWA	0.002 mg/m3	
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
Molybdenum (CAS 7439-98-7)	TWA	1 mg/m3	
		5 mg/m3	Respirable fraction.
	10 mg/m3	Inhalable fraction.	
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	
Silica (CAS 14808-60-7)	TWA	0.05 mg/m3	Respirable fraction.
Tungsten (CAS 7440-33-7)	STEL	10 mg/m3	Respirable fraction.
	TWA	5 mg/m3	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Molybdenum (CAS 7439-98-7)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Inhalable fraction.

Biological limit values

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

Exposure guidelines

Korea OELs: Skin designation

Beryllium Oxide (CAS 1304-56-9)

Substance can be absorbed through membrane, eye and skin and can cause whole body effects (It does not mean skin irritant).

B. Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas.

Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate. Where utilized, exhaust inlets to the ventilation system must be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users. Use qualified professionals to design and install ventilation systems.

C. 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.
- **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.
- **Hand protection** Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.
- **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.

Hygiene measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

A. Appearance

- Physical state Solid.
- Form Various shapes.
- Color Grayish-white

B. Odor Not applicable.

C. Odor threshold Not applicable.

D. pH Not applicable.

E. Melting point/freezing point

- Melting point 1948.57 °F (1064.76 °C) estimated
- Freezing point 1948.57 °F (1064.76 °C) estimated

F. Boiling point, initial boiling point, and boiling range 3741.8 °F (2061 °C) estimated

G. Flash point Not applicable.

H. Evaporation rate Not applicable.

I. Flammability (solid, gas) Not available.

J. Upper/lower limit on flammability or explosive limits

- Flammability limit - lower (%) Not applicable.
- Flammability limit - upper (%) Not applicable.
- Explosive limit - lower (%) Not applicable.
- Explosive limit - upper (%) Not applicable.

K. Vapor pressure 0.05 hPa estimated

L. Solubility

- Solubility (water) Not applicable.

M. Vapor density Not applicable.

N. Specific gravity 4.55 estimated

O. n-octanol/water partition coefficient Not available.

P. Auto-ignition temperature Not applicable.

Q. Decomposition temperature Not applicable.

R. Viscosity Not applicable.

S. Molecular weight	Not available.
Other data	
Density	4.55 g/cm ³ estimated
Relative density	Not applicable.

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

A. Stability and hazardous reaction potential

Stability Material is stable under normal conditions.

Hazardous reaction potential Hazardous polymerization does not occur.

B. Conditions to avoid (e.g. static discharge, shock or vibration, etc) Avoid dust formation. Contact with acids. Contact with alkalis.

C. Incompatible materials Strong acids, alkalies and oxidizing agents.

D. Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure

- **Respiratory organs** May cause sensitization by inhalation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause damage to organs (respiratory system) through prolonged or repeated exposure.
- **Skin** May cause an allergic skin reaction.
- **Eyes** Harmful in contact with eyes.
- **Mouth** Toxic if swallowed.

B. Information on health hazards

- **Acute toxicity (list all possible routes of exposure)** May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction.
- **Corrosivity or irritation to the skin** Not likely, due to the form of the product.
- **Serious eye damage/eye irritation** Harmful in contact with eyes.
- **Respiratory sensitization** May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **Skin sensitization** May cause an allergic skin reaction.
- **Carcinogenic properties /Carcinogenicity** Cancer hazard.

IARC Monographs. Overall Evaluation of Carcinogenicity

Beryllium Oxide (CAS 1304-56-9)	1 Carcinogenic to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Silica (CAS 14808-60-7)	1 Carcinogenic to humans.

- **Mutagenic properties /Mutagenicity** Due to lack of data the classification is not possible.
- **Reproductive toxicity** Not classified.
- **Specific target organ toxicity - single exposure** May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **Specific target organ toxicity - repeated exposure** May cause damage to organs (respiratory system) through prolonged or repeated exposure by inhalation.
- **Aspiration hazard** Due to lack of data the classification is not possible.

12. Ecological information

A. Ecotoxicity

Product	Species		Test Results
Metallized Beryllia Ceramic			
Aquatic			
<i>Acute</i>			
Crustacea	EC50	Daphnia	2000 mg/l, 48 hours estimated
Fish	LC50	Fish	0.6 mg/l, 4 days estimated
Components	Species		Test Results

Nickel (CAS 7440-02-0)

Aquatic

Acute

Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.06 mg/l, 4 days
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Hazardous to the aquatic environment, acute hazard

Very toxic to aquatic life.

B. Persistence/degradability

No data is available on the degradability of this product.

C. Bioaccumulative potential

Not available.

D. Mobility in soil

Not available.

E. Other adverse effects

Not available.

13. Disposal considerations

A. Method of disposal

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.

B. Disposal considerations (including disposal of contaminated containers or packaging)

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.

14. Transport information

IATA

A. UN number Not applicable.

B. UN proper shipping name Not applicable.

C. Transport hazard class(es)

Class Not applicable.

Subsidiary risk -

D. Packing group Not applicable.

E. Environmental hazards No.

F. Special precautions for user Not applicable.

IMDG

A. UN number Not applicable.

B. UN proper shipping name Not applicable.

C. Transport hazard class(es)

Class Not applicable.

Subsidiary risk -

D. Packing group Not applicable.

E. Environmental hazards

Marine pollutant No.

EmS Not applicable.

F. Special precautions for user Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not available.

15. Regulatory information

A. Restrictions under the Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacturing

Not regulated.

Harmful Substances Requiring Permission for Manufacture or Use

Beryllium Oxide (CAS 1304-56-9)

Controlled Hazardous Substances

Manganese (CAS 7439-96-5)

Tungsten (CAS 7440-33-7)

Nickel (CAS 7440-02-0)

Harmful Substances Requiring Special Medical Examination

Beryllium Oxide (CAS 1304-56-9)

Manganese (CAS 7439-96-5)

Nickel (CAS 7440-02-0)

Tungsten (CAS 7440-33-7)

Workplace Environmental Monitoring Harmful Materials

Beryllium Oxide (CAS 1304-56-9)

Manganese (CAS 7439-96-5)

Nickel (CAS 7440-02-0)

Tungsten (CAS 7440-33-7)

SILICA: QUARTZ (CAS 14808-60-7)

Dust

Occupational Exposure Limit

Beryllium Oxide (CAS 1304-56-9)

Manganese (CAS 7439-96-5)

Molybdenum (CAS 7439-98-7)

Nickel (CAS 7440-02-0)

Silica (CAS 14808-60-7)

Tungsten (CAS 7440-33-7)

B. Restrictions under the Chemicals Control Law (Previously Toxic Chemicals Control Law)

Accidental Release Prevention Substances

Not regulated.

Act on the Registration and Evaluation of Chemicals

Banned Toxic Chemicals

Not regulated.

Designated Existing Chemicals Subject to Registration (PEC) (MoE No. 2015-92)

Silica (CAS 14808-60-7)

Restricted Chemical Substances

Not regulated.

Toxic Chemicals

Not regulated.

C. Restrictions under the Dangerous Substance Safety Management Act

D. Restrictions under the Wastes Control Act

Halogenated Materials in Waste Organic Solvents

Not regulated.

Hazardous Substances

Not regulated.

E. Restrictions under other foreign or domestic laws

Clean Air Conservation Act

Air Pollutants

Beryllium Oxide (CAS 1304-56-9)

Manganese (CAS 7439-96-5)

Nickel (CAS 7440-02-0)

Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides (Rules on PIC, MoE No. 2014-252, Dec. 31, 2014; Standards for Pesticides, RDA No. 2014-26), as amended

Not listed.

Specific Air Pollutants

Beryllium Oxide (CAS 1304-56-9)

Nickel (CAS 7440-02-0)

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

A. Source of information	Not available.
B. Issue date	02-06-2017
C. Number of revisions and date of most recent revision	04-28-2021 (02 revision)
D. Other	Revised information in Section 16.

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: Supplemental information
First aid measures: E. Note to physician
Exposure controls/personal protection: B. Appropriate engineering controls
Other information: Further information
Other information: D. Other