



MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name Beryllium Oxide Ceramic Product

Other means of identification

SDS number C10

CAS number 1304-56-9

Synonym(s) Beryllium Oxide, Beryllia, Thermalox® 995, BW 1000®, BW3250®, Thermalox® CR

B. Recommended use and Limitations on use

Recommended use Manufacture of computer, electronic and optical products, electrical equipment

C. Supplier information

Company name Materion Brush Inc.

Address 6070 Parkland Boulevard
Mayfield Heights OH 44124
United States

Email Materion-PS@materion.com

Contact person Product Stewardship Director

Emergency telephone number +1.216.383.4019

2. Hazards identification

A. Hazard category/Classification

Physical hazards Not classified.

Health hazards Acute toxicity, inhalation Category 1
Carcinogenicity Category 1B
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

H350i May cause cancer by inhalation.

H317 May cause an allergic skin reaction.

H330 Fatal if inhaled.

H350 May cause cancer.

H372 Causes damage to organs (Respiratory system) through prolonged or repeated exposure.

• 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.

P271 Use only outdoors or in a well-ventilated area.

P272 Contaminated work clothing must not be allowed out of the workplace.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 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.
P310	Immediately call a POISON CENTER/doctor.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.

Storage

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Disposal

P501	Dispose of contents/container according to waste-related laws.
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C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard) None known.

Supplemental information Exposure to the elements listed in Section 3 by inhalation, ingestion, and skin contact can occur when melting, casting, gross handling, pickling, chemical cleaning, heat treating, abrasive cutting, welding, grinding, sanding, polishing, milling, crushing, or otherwise heating or abrading the surface of this material in a manner which generates particulate.

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 Ceramic Product	Beryllium Oxide, Beryllia, Thermalox® 995, BW 1000®, BW3250®, Thermalox® CR	1304-56-9	KE-02840	100

4. First aid measures

A. In case of eye contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists. 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	Rinse with water. 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	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician if symptoms develop or persist. 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. Rinse mouth. 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

Dusts may irritate the respiratory tract, skin and eyes. Prolonged exposure may cause chronic effects. 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

Wash contaminated clothing before reuse. As supplied, there is no immediate medical risk with beryllium products in massive form. First aid measures provided are related to particulate containing beryllium.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media

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

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)

During fire, gases hazardous to health may be formed.

C. Specific methods of fire-fighting

Special protective equipment for firefighters

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

Special fire fighting procedures

Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers. Water runoff can cause environmental damage.

General fire hazards

No unusual fire or explosion hazards noted.

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

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe dust. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the MSDS. In solid form this material poses no special clean-up problems.

B. Environmental precautions

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Avoid release to the environment. 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

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Collect dust using a vacuum cleaner equipped with HEPA filter. Clean up in accordance with all applicable regulations. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the MSDS.

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. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Do not breathe dust. Avoid prolonged exposure. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash thoroughly after handling. Observe good industrial hygiene practices.

B. Conditions for safe storage (including any incompatibilities)

Keep locked-up. Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the MSDS). Avoid contact with acids and alkalies. Avoid contact with oxidizing agents.

8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. Exposure Limits for Chemicals and Physical Agents, Occupational Safety and Health Act "K-OSHA" Article 106

Material	Type	Value
Beryllium Oxide Ceramic Product (CAS 1304-56-9)	STEL	0.01 mg/m ³
	TWA	0.002 mg/m ³

US. ACGIH Threshold Limit Values (TLV)

Material	Type	Value	Form
Beryllium Oxide Ceramic Product (CAS 1304-56-9)	TWA	0.00005 mg/m ³	(as Inhalable fraction. beryllium)

Biological limit values

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

Exposure guidelines

Korea OELs: Skin designation

Beryllium Oxide Ceramic Product (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

VENTILATION: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

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.

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.

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

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 Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

A. Appearance

Physical state Solid.
Form Solid Various shapes.
Color White.

B. Odor Not applicable.

C. Odor threshold Not applicable.

D. pH Not applicable.

E. Melting point/freezing point

Melting point 4586 °F (2530 °C)

Freezing point 4586 °F (2530 °C)

F. Boiling point, initial boiling point, and boiling range 7052 °F (3900 °C)

G. Flash point Not applicable.

H. Evaporation rate Not applicable.

I. Flammability (solid, gas) Not applicable.

J. Upper/lower limit on flammability or explosive limits

Explosive limit - lower (%) Not applicable.

Explosive limit - upper (%) Not applicable.

K. Vapor pressure 6.67 kPa at 25°C estimated

L. Solubility

Solubility (water) Not applicable.

Solubility (other) Not applicable.

M. Vapor density Not applicable.

N. Specific gravity 1.85 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 25.01 g/mol

Other data

Density 3.01 g/cm³
3.01 g/cm³ estimated

Explosive properties Not explosive.

Explosivity Not applicable.

Molecular formula Be-O

Oxidizing properties Not oxidizing.

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) Contact with incompatible materials. 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	Fatal if inhaled.
• Skin	Not likely, due to the form of the product.
• Eyes	Not likely, due to the form of the product.
• Mouth	Not likely, due to the form of the product.

B. Information on health hazards

• Acute toxicity (list all possible routes of exposure)	Fatal if inhaled.
• Corrosivity or irritation to the skin	Not likely, due to the form of the product.
• Serious eye damage/eye irritation	Not likely, due to the form of the product.
• Respiratory sensitization	May cause damage to organs (respiratory system) through prolonged or repeated exposure.
• Skin sensitization	Not a skin sensitizer.
• Carcinogenic properties /Carcinogenicity	Cancer hazard.

IARC Monographs. Overall Evaluation of Carcinogenicity

Beryllium Oxide Ceramic Product (CAS 1304-56-9) 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	Not classified.
• Specific target organ toxicity - repeated exposure	Causes damage to organs (Respiratory system) through prolonged or repeated exposure.
• Aspiration hazard	Due to lack of data the classification is not possible.

12. Ecological information

A. Ecotoxicity	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.
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	No data available.
D. Mobility in soil	No data available.
E. 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.

13. Disposal considerations

A. Method of disposal	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container (in accordance with related regulations). 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.
Waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

14. Transport information

National regulations

KSSTDG

- A. UN number Not regulated as dangerous goods.
B. UN proper shipping name Not regulated as dangerous goods.
C. Transport hazard class(es)
 Class Not assigned.
 Subsidiary risk -
D. Packing group -
E. Environmental hazards
 Marine pollutant No.
 EmS Not assigned.
F. Special precautions for user Not assigned.

International regulations

IATA

- A. UN number Not regulated as dangerous goods.
B. UN proper shipping name Not regulated as dangerous goods.
C. Transport hazard class(es)
 Class Not assigned.
 Subsidiary risk -
D. Packing group -
E. Environmental hazards No.
F. Special precautions for user Not assigned.

IMDG

- A. UN number Not regulated as dangerous goods.
B. UN proper shipping name Not regulated as dangerous goods.
C. Transport hazard class(es)
 Class Not assigned.
 Subsidiary risk -
D. Packing group -
E. Environmental hazards
 Marine pollutant No.
 EmS Not assigned.
F. Special precautions for user Not assigned.

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

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 Ceramic Product (CAS 1304-56-9)

Controlled Hazardous Substances

Not regulated.

Harmful Substances Requiring Special Medical Examination

Beryllium Oxide Ceramic Product (CAS 1304-56-9)

Workplace Environmental Monitoring Harmful Materials

Beryllium Oxide Ceramic Product (CAS 1304-56-9)

Occupational Exposure Limit

Beryllium Oxide Ceramic Product (CAS 1304-56-9)

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)

Not listed.

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 Ceramic Product (CAS 1304-56-9)

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 Ceramic Product (CAS 1304-56-9)

Further information

This material safety data sheet was prepared in accordance with Ministry of Employment and Labor Notice No 2020-130.

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

ACGIH
EPA: AQUIRE database
Korea. Dangerous Substances Threshold Quantity (Presidential Decree of Dangerous Substances Safety Management Act No. 18406, Schedule 1)
Korea. Regulated volatile organic compounds (VOCs) (MOE Notice No. 2001-36, March 8, 2001, as amended)
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
Korea. GHS Labeling Requirements. Standards for Classification and Labeling of Chemical Substances and Material Safety Data Sheets (MSDS), as amended
Korea. KOSHA GHS Classifications List (Korea Occupational Safety & Health Agency)
Korea. NEMA GHS Classification List (National Emergency Management Agency GHS Guidance for Classification and Labeling for Dangerous Goods)
Toxic Release Inventory (TRI) Chemicals (MOE Public Notice No. 2002-166, Nov. 8, 2002), as amended

B. Issue date

08-13-2015

C. Number of revisions and date of most recent revision

04-12-2024 (05 revision)

D. Other

Revised information in Section 16.

Further information

Transportation Emergency
Call Chemtrec at:
US: 800.424.9300
International: 703.741.5970
Spain: 900.868.538
Switzerland: 0800.564.402
Chemtrec's toll free, mobile-enabled number in Germany – 0800 1817059
South Korea Toll-free Number – 080-880-0468

Disclaimer

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Revision information

This document has undergone significant changes and should be reviewed in its entirety.