SAFETY DATA SHEET

1. Identification

Product identifier Beryllium Oxide Ceramic Product

Other means of identification
SDS number C10
Synonyms Beryllium Oxide, Beryllia, Thermalox® 995, BW 1000®, BW3250®, Thermalox® CR

Manufacturer/Importer/Supplier/Distributor information
Manufacturer
Company name Materion Brush Inc.
Address 6070 Parkland Boulevard
Mayfield Heights, OH 44124
United States
Telephone 800.862.4118
Website www.materion.com
E-mail ehs@materion.com
Contact person Theodore Knudson
Emergency phone number 800.862.4118

2. Hazard(s) identification

Physical hazards Not classified.
Health hazards
Sensitization, respiratory Category 1
Sensitization, skin Category 1
Carcinogenicity Category 1
Specific target organ toxicity, repeated exposure Category 1 (Respiratory system)

Environmental hazards Not classified.
OSHA defined hazards Not classified.

Label elements

Signal word 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: Call a poison center/doctor. 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.

Hazard(s) not otherwise classified (HNOC)

None known.

Supplemental information

For further information, please contact the Product Stewardship Department at +1.800.862.4118.

3. Composition/information on ingredients

Substances

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium Oxide</td>
<td>Beryllium Oxide</td>
<td>1304-56-9</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Beryllia</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Thermolox</td>
<td></td>
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<tr>
<td></td>
<td>Thermolox 995</td>
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<td></td>
<td>BW 1000</td>
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<td>BW 3250</td>
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<td></td>
<td>BWTF</td>
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<tr>
<td></td>
<td>Durox - CR</td>
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</table>

4. First-aid measures

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.

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.

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.

Ingestion

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. Inhaling particulate containing beryllium oxide can cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals.
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. These latter agents remain investigational. Further, 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. In general, these medications should be reserved for cases with significant symptoms and/or significant loss of lung function. Other symptomatic treatment, such as oxygen, inhaled steroids or bronchodilators, may be prescribed by some physicians and can be effective in selected cases.

The decision about when and with what medication to treat is a judgment situation for individual physicians. For the most part, treatment is reserved for those persons with symptoms and measurable loss of lung function. The value of starting oral steroid treatment, before signs or symptoms are evident, remains a medically unresolved issue.

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.

General information

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 oxide ceramic products in article form. First aid measures provided are related to particulate containing beryllium oxide.

5. Fire-fighting measures

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.

Specific hazards arising from the chemical
Not applicable.

Special protective equipment and precautions for firefighters
Firefighters should wear full protective clothing including self contained breathing apparatus. Wear suitable protective equipment.

Fire fighting equipment/instructions
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

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.

Methods and materials for containment and cleaning up
Clean up in accordance with all applicable regulations.

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.

7. Handling and storage

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.
8. Exposure controls/personal protection

Occupational exposure limits

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<thead>
<tr>
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<th>Type</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Beryllium Oxide Ceramic Product</td>
<td>Ceiling</td>
<td>0.005 mg/m3</td>
</tr>
<tr>
<td>Components</td>
<td>TWA</td>
<td>0.002 mg/m3</td>
</tr>
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US, ACGIH Threshold Limit Values

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<td>Beryllium Oxide Ceramic Product</td>
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<td>0.00005 mg/m3</td>
<td>Inhalable fraction.</td>
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US, NIOSH: Pocket Guide to Chemical Hazards

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Biological limit values

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

Individual protection measures, such as personal protective equipment

Eye/face 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 particulate such as melting, casting, machining, grinding, welding and powder handling.

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

Other
Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities such as machining, furnace rebuilding, air cleaning equipment filter changes, maintenance, furnace tending, etc. 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.

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.

Thermal hazards
Not applicable.

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

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

Material name: Beryllium Oxide Ceramic Product
Odor
Not applicable.
Odor threshold
Not applicable.
pH
Not applicable.
Melting point/freezing point
4586 °F (2530 °C)
Initial boiling point and boiling range
7052 °F (3900 °C)
Flash point
Not applicable.
Evaporation rate
Not applicable.
Flammability (solid, gas)
Not applicable.
Upper/lower flammability or explosive limits
Flammability limit - lower (%)
Not applicable.
Flammability limit - upper (%)
Not applicable.
Explosive limit - lower (%)
Not applicable.
Explosive limit - upper (%)
Not applicable.
Vapor pressure
6.67 kPa at 25°C estimated
Vapor density
Not applicable.
Relative density
Not applicable.
Solubility(ies)
Solubility (water)
Not applicable.
Partition coefficient
Not available.
(n-octanol/water)
Auto-ignition temperature
Not applicable.
Decomposition temperature
Not applicable.
Viscosity
Not applicable.
Other information
Density
3.01 g/cm3 estimated
Molecular formula
Be-O
Molecular weight
25.01 g/mol
Specific gravity
1.85 estimated

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
Hazardous polymerization does not occur.

Conditions to avoid
Avoid dust formation. Contact with acids. Contact with alkalis.

Incompatible materials
Strong acids, alkalies and oxidizing agents.

Hazardous decomposition products
No hazardous decomposition products are known.

11. Toxicological information
Information on likely routes of exposure
Inhalation
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 contact
May cause an allergic skin reaction.

Eye contact
Harmful in contact with eyes.
Ingestion
Not likely, due to the form of the product.

Symptoms related to the physical, chemical and toxicological characteristics
Respiratory disorder.

Information on toxicological effects

Acute toxicity
May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction.

Skin corrosion/irritation
Not likely, due to the form of the product.

Serious eye damage/eye irritation
Harmful in contact with eyes.

Respiratory or skin sensitization

ACGIH Sensitization
Beryllium Oxide (CAS 1304-56-9)  Respiratory sensitization

Respiratory sensitization
May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin sensitization
May cause an allergic skin reaction.

Germ cell mutagenicity
Due to lack of data the classification is not possible.

Carcinogenicity
Cancer hazard.

IARC Monographs. Overall Evaluation of Carcinogenicity
Beryllium Oxide (CAS 1304-56-9)  1 Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens
Beryllium Oxide (CAS 1304-56-9)  Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
Not listed.

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.

Chronic effects
Hazardous by OSHA criteria. May cause damage to organs through prolonged or repeated exposure.

Further information
Symptoms may be delayed.

12. Ecological information

Ecotoxicity
No ecotoxicity data noted for the ingredient(s).

Persistence and degradability
No data is available on the degradability of this product.

Bioaccumulative potential
Not available.

Mobility in soil
Not available.

Other adverse effects
Not available.

13. Disposal considerations

Disposal instructions
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. When this product as supplied is to be discarded as waste, it does not meet the definition of a RCRA waste under 40 CFR 261.

Hazardous waste code
Not regulated.

Waste from residues / unused products
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

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

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

15. Regulatory information

US federal regulations

All components are on the U.S. EPA TSCA Inventory List.

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Beryllium Oxide (CAS 1304-56-9) Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

Yes

SARA 313 (TRI reporting)

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Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Beryllium Oxide (CAS 1304-56-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA)

Priority pollutant

Section 112(r) (40 CFR 68,130)

Toxic pollutant

Safe Drinking Water Act (SDWA)

0.004 mg/l

US state regulations

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - New Jersey RTK - Substances: Listed substance

Beryllium Oxide (CAS 1304-56-9)

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Beryllium Oxide (CAS 1304-56-9)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.
US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))
Beryllium Oxide (CAS 1304-56-9)

US. Massachusetts RTK - Substance List
Beryllium Oxide (CAS 1304-56-9)

US. New Jersey Worker and Community Right-to-Know Act
Beryllium Oxide (CAS 1304-56-9)

US. Pennsylvania RTK - Hazardous Substances
Beryllium Oxide (CAS 1304-56-9)

US. Pennsylvania Worker and Community Right-to-Know Law
Beryllium Oxide (CAS 1304-56-9)

US. Rhode Island RTK
Beryllium Oxide (CAS 1304-56-9)

US. California Proposition 65

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
Beryllium Oxide (CAS 1304-56-9) Listed: October 1, 1987

16. Other information, including date of preparation or last revision
Issue date 07-07-2015
Version # 01

Further information
Transportation Emergency
Call Chemtrec at:
Domestic: 800.424.9300
International: 703.527.3887

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