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: 1.800.862.4118
- Website: www.materion.com
- E-mail: ehs@materion.com
- Contact person: Theodore Knudson
- Emergency phone number: 1.800.862.4118

2. Hazard(s) identification

Physical hazards: Not classified.

Health hazards:
- 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. Causes damage to organs (respiratory system) through prolonged or repeated exposure by inhalation.

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

Exposure to the elements listed in Section 3 by inhalation, ingestion, and skin contact can occur when melting, casting, dross 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 +1.800.862.4118.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
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<tr>
<td>Beryllium Oxide</td>
<td></td>
<td>1304-56-9</td>
<td>100</td>
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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.

Indication of immediate medical attention and special treatment needed

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.”

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.
6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. In solid form this material poses no special clean-up problems.

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.

Conditions for safe storage, including any incompatibilities
Keep locked-up. Avoid contact with acids and alkalies. Avoid contact with oxidizing agents.

8. Exposure controls/personal protection

Occupational exposure limits
The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

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<thead>
<tr>
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<td>TWA</td>
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Material name: Beryllium Oxide Ceramic Product

Based on joint research conducted with the National Institute for Occupational Safety and Health (NIOSH), Materion adopted an 8 element Beryllium Worker Protection Model (BWPM) which includes the use of a recommended exposure guideline (REG) for airborne beryllium of 0.2 µg/m³ as a time-weighted average (TWA) limit for an 8-hour work day. Subsequent NIOSH studies have shown that the BWPM has reduced but not eliminated the risk of beryllium sensitization and chronic beryllium disease (CBD) in workers. Information on the BWPM can be found at www.berylliumsafety.com or by contacting Materion at +1 800.862.4118. In January 2017, OSHA issued a comprehensive occupational health standard for beryllium which includes a Permissible Exposure Limit (PEL) of 0.2 µg/m³ as an 8-hour TWA. In its evaluation, OSHA concluded that “despite the reduction in risk expected with the new PEL, the risks of CBD and cancer to workers with average exposure levels of 0.2 µg/m³ are still clearly significant.” (Preamble to Final Rule, Occupational Exposure to Beryllium, Docket #OSHA-H005C-2006-0870, at 316.) Therefore, Materion recommends that beryllium users not only comply with the OSHA Beryllium Standard and carefully apply all elements of the BWPM, but reduce airborne exposures to the lowest feasible level.

The American Conference of Governmental Industrial Hygienists (ACGIH®) is a scientific body that has developed guidelines for all listed substances. In its development documents, the ACGIH® states that “Threshold Limit Values and Biological Exposure Indices represent conditions under which ACGIH® believes that nearly all workers may be repeatedly exposed without adverse health effects. They are not fine lines between safe and dangerous exposures, nor are they a relative index of toxicology.”

Specific genetic factors have been identified and shown to increase an individual’s susceptibility to CBD. Medical testing is available to detect those genetic factors in individuals.
### Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas. 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.

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.

### 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 dust, mist or fume.

#### 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. 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

Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. 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.

- **Odor**
  
  None.

- **Odor threshold**
  
  Not applicable.

- **pH**
  
  Not applicable.

- **Melting point/freezing point**
  
  4586 °F (2530 °C) / Not applicable.

- **Initial boiling point and boiling range**
  
  Not applicable.

- **Flash point**
  
  Not applicable.

- **Evaporation rate**
  
  Not applicable.

- **Flammability (solid, gas)**
  
  None known.

#### Upper/lower flammability or explosive limits

- **Explosive limit - lower (%)**
  
  Not applicable.

- **Explosive limit - upper (%)**
  
  Not applicable.

- **Vapor pressure**
  
  Not applicable.
Material name: Beryllium Oxide Ceramic Product

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, alkalis and oxidizing agents.
Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure
Inhalation May cause damage to organs (respiratory system) through prolonged or repeated exposure.
Skin contact Not likely, due to the form of the product.
Eye contact Not likely, due to the form of the product.
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 Based on available data, the classification criteria are not met.
Skin corrosion/irritation Not likely, due to the form of the product.
Serious eye damage/eye irritation Not likely, due to the form of the product.

Respiratory or skin sensitization
ACGIH sensitization
BERYLLIUM AND COMPOUNDS, SOLUBLE AND INSOLUBLE COMPOUNDS, AS BE, INHALABLE FRACTION (CAS 1304-56-9) Respiratory sensitization
Respiratory sensitization May cause damage to organs (respiratory system) through prolonged or repeated exposure.
Skin sensitization Not a skin sensitizer.
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.

Vapor density Not applicable.
Relative density Not applicable.
Solubility(ies)
Solubility (water) Insoluble.
Partition coefficient (n-octanol/water) Not applicable.
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
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)
Beryllium Oxide (CAS 1304-56-9) Cancer
US. National Toxicology Program (NTP) Report on Carcinogens
Beryllium Oxide (CAS 1304-56-9) Known To Be Human Carcinogen.

Reproductive toxicity Not classified.
Specific target organ toxicity - single exposure Not classified.
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.
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.

Toxic Substances Control Act (TSCA)
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.

SARA 304 Emergency release notification
Not regulated.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)
Beryllium Oxide (CAS 1304-56-9)  Cancer
lung effects (CBD and acute beryllium disease)
beryllium sensitization
respiratory tract irritation

Superfund Amendments and Reauthorization Act of 1986 (SARA)
SARA 302 Extremely hazardous substance
Not listed.
SARA 311/312 Hazardous chemical
No (Exempt)
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) Contains component(s) regulated under the Safe Drinking Water Act.

US state regulations
WARNING: This product contains a chemical known to the State of California to cause cancer.
California Proposition 65
WARNING: This product can expose you to Beryllium Oxide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance
Beryllium Oxide (CAS 1304-56-9) Listed: October 1, 1987
US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))
Beryllium Oxide (CAS 1304-56-9)

16. Other information, including date of preparation or last revision
Issue date 07-07-2015
Revision date 12-28-2018
Version # 06
Further information Transportation Emergency
Call Chemtrec at:
Domestic: 800.424.9300
International: 703.527.3887

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Other information Revised information in Section 9.
Revised information in Section 15.