



## Material Safety Data Sheet

Product No. 1655, 1655-B, 1656 Beryllium Products

Issue Date (03-08-11)

Review Date (05-04-12)

### Section 1: Product and Company Identification

**Product Name: Beryllium Products**

Synonym: Be, Glucinium

**Company Name**

Ted Pella, Inc., P.O. Box 492477, Redding, CA 96049-2477

Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

Chemtrec Emergency Number 1-800-424-9300 24 hrs a day.

### Section 2: Composition / Information on Ingredients

Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)	%	OSHA PEL mg/m3	ACGIH TLV mg/m3	NTP	IARC	OSHA regulated
Beryllium (7440-41-7)	~100	0.002	0.00005	Known	Group I	Known

### Section 3: Hazard Identification

#### Emergency overview

**Note:** As used in this Material Safety Data Sheet, the term "particulate" refers to dust, mist, fume, fragments, particles and/or powder. It must also be noted that the products listed above are offered for sale only for use in microscopy and metallography and are not offered for any other application. Hence, if these products are used for the purposes intended there will not be any possibility for the generation of particulates with potentially dangerous consequences.

Appearance: Gray Metallic Solid

Immediate effects: Metallic product which poses little or no immediate hazard in solid form. See label in Section 16. If the material is involved in a fire; pressure-demand self-contained breathing apparatus and protective clothing must be worn by persons potentially exposed to the airborne particulate during or after a fire. Beryllium: The beryllium in this product is not known to cause acute health effects. Inhaling particulate containing beryllium may cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals.

#### Potential health effects

Primary Routes of entry: 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.

Particulate depositing on hands, gloves, and clothing, can be transferred to the breathing zone and inhaled during normal hand to face motions such as rubbing of the nose or eyes, sneezing, coughing, etc.

Signs and Symptoms of Overexposure: Workers with advanced CBD may have one or more of the following symptoms: unexplained cough; shortness of breath, especially with activity; fatigue; weight loss or loss of appetite; fever; or night sweats. However, because the disease may develop slowly over a period of many years, workers may have the disease for a long time without knowing it.

Eyes: Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate.

Skin: Skin abrasion may cause irritation. A skin disease, which is characterized by poor wound healing and a rash or wart-like bumps, can occur as a result of the skin being exposed to beryllium dust.

Ingestion: Not known to cause acute health effects.

Inhalation: Not known to cause acute health effects. Acute beryllium disease usually has a quick onset and has symptoms that resemble those of pneumonia or bronchitis. The acute form of the disease is believed to occur as a result of exposures well above the current PEL. This form of beryllium disease is now rare.

Chronic Exposure: See note to physician Section 4

Chemical Listed As Carcinogen Or Potential Carcinogen: Beryllium (7440-41-7).

ACGIH: Yes. IARC: Yes. NTP: Yes. OSHA: Yes.

See Toxicological Information (Section 11)

#### **Potential environmental effects**

See Ecological Information (Section 12)

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### **Section 4: First Aid Measures**

#### **If accidental overexposure is suspected**

Eye(s) Contact: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately

Skin Contact: 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.

Inhalation: Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

Ingestion: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

#### **Note to physician**

Treatment: 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. Specific genetic factors have been identified and have been shown to increase an individual's susceptibility to CBD. Medical testing is available to detect genetic factors in individuals.

**Medical Conditions generally Aggravated by Exposure:** Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if particulate is inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause exposure. Beryllium: The effects of chronic beryllium disease on the lungs and heart are additive to the effects of other health conditions.

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## **Section 5: Fire Fighting Measures**

Flash Point: Not Applicable to Solids.

Flammable Limits: Not Applicable to Solids.

Auto-ignition point: Not Applicable to Solids.

Fire Extinguishing Media: Only in powder or other finely divided form does this material present a special fire problem. To extinguish a metal powder fire, use Class D fire extinguishing powder.

Special Fire Fighting Procedures: 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.

Unusual Fire and Explosion Hazards: Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions. In addition, water may disassociate when in contact with burning metal particulate or chips releasing flammable hydrogen gas which could burn and result in an explosion. Ventilation duct work which has accumulated a fine coating of this material as a particulate on its internal surface poses a potentially serious fire hazard. Extinguish using Class D fire extinguisher media and shut down or isolate the affected portion of the ventilation system. Because of

this potential risk, sources of ignition such as flame, spark from machining of other materials, welding spark, etc. must not be allowed to enter the ventilation duct work. Also, duct work must be made of non-combustible material. See Section 8 for further information regarding personal protective measures.

Hazardous combustion products:

DOT Class: Not regulated.

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### **Section 6: Accidental Release Measures**

Steps to be Taken in Case Material is Released or Spilled: If this material is a particulate, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill (see Section 8). Cleanup spills with a vacuum system utilizing a high efficiency particulate air (HEPA) filtration system followed by wet cleaning methods. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Be careful to minimize airborne generation of particulate and avoid contamination of air and water. Depending upon the quantity of material released into the environment, the incident may be required to be reported to the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

Waste Disposal Methods: Dispose of waste according to Federal, State and Local Regulations.

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### **Section 7: Handling and Storage**

Precautions to be taken in Handling and Storage: Particulate may enter the body through cuts, abrasions or other wounds on the surface of the skin. Wear gloves when handling parts with loose surface particulate or sharp edges. As a standard hygiene practice, wash hands before eating or smoking. Store in a dry area. Salts from handling beryllium without gloves along with humidity in the air are sufficient to cause “finger print” corrosion on a bare beryllium part.

Storage temperature: Room temperature.

Storage Pressure: NA

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### **Section 8: Exposure Controls / Personal Protection**

#### **Engineering Controls**

Ventilation required: 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.

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. To prevent exposure, remove surface scale or oxidation formed on cast or heat treated products in an adequately ventilated process prior to working the surface.

### **Personal Protection Equipment**

**Respiratory protection:** When airborne exposures exceed or have the potential to exceed the occupational limits shown in Section 8.15, 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. Exposure to unknown concentrations of particulate requires the wearing of a pressure-demand airline respirator or pressure-demand self-contained breathing apparatus (SCBA). Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air cleaning device.

Recent data suggest that exposures to beryllium even at levels below the 2 micrograms/m<sup>3</sup> PEL may have caused CBD in some workers. Therefore, employers should consider providing their beryllium-exposed workers with air-purifying respirators equipped with 100-series filters (either N-, P-, or R-type) or, where appropriate, powered air-purifying respirators equipped with HEPA filters, particularly in areas where material containing beryllium can become airborne.

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

**Skin protection:** Wear gloves and appropriate protective clothing.

**Eye protection:** Wear safety glasses, goggles, face shield or welder's helmet when risk of eye injury is present, particularly during melting, casting, machining, grinding, welding, powder handling, etc.

**Additional clothing and/or equipment:** 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.

### **Exposure Guidelines**

See Composition/Information on Ingredients (Section2)

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## **Section 9 Physical and Chemical Properties**

Appearance and Physical State: Gray Metallic Solid

Odor (threshold): None

Specific Gravity (H<sub>2</sub>O=1): 1.85 g/cc

Vapor Pressure (mm Hg): NA

Vapor Density (air=1): NA

Percent Volatile by volume: NA

Evaporation Rate (butyl acetate=1): NA

Boiling Point: 5378 °F

Freezing point / melting point: 2345 °F

pH: NA

Solubility in Water: Insoluble

Molecular Weight: 9.1

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### **Section 10: Stability and Reactivity**

Stability: Stable.

Conditions to Avoid: Beryllium is corrosion-resistant in air and water up to 600°C. This is attributed to the formation of an adherent oxide layer on the surface. The presence of salts in water, particularly chloride, dramatically accelerates the corrosion of beryllium. This corrosion can be further accelerated (galvanic corrosion) if beryllium is in contact with a less reactive metal. Contrarily, beryllium can be protected from corrosion by contact with a more reactive metal (anodic protection). Generally, some corrosion protection should be applied to beryllium. Salts from handling beryllium without gloves along with humidity in the air are sufficient to cause “finger print” corrosion on a bare beryllium part.

Materials to Avoid (Incompatibility): Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas. Hydrogen gas can be an explosion hazard.

Hazardous Decomposition Products: Toxic metal oxide fume.

Hazardous Polymerization: Will not occur.

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### **Section 11: Toxicological Information**

Results of component toxicity test performed: For questions concerning toxicological information, write to: Medical Director, Materion Brush Inc., 14710 West Portage River South Road, Elmore, Ohio 43416-9502.

Human experience: ND

This product **does** contain any compounds listed by NTP or IARC or regulated by OSHA as a carcinogen. Beryllium CAS# 7440-41-7.

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### **Section 12: Ecological Information**

Ecological Information: ND

Chemical Fate Information: ND

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### **Section 13 Disposal Considerations**

RCRA 40 CFR 261 Classification: When recycled (used in a process to recover metals), this material is not classified as hazardous waste under federal law. Seal particulate or particulate containing materials inside two plastic bags, place in a DOT approved container, and label appropriately. When spent products are declared solid wastes (no longer recyclable), they must be labeled, managed and disposed of, in accordance with

federal, state and local requirements. This material is not classified a hazardous waste under federal law.

The U.S. Environmental Protection Agency has classified beryllium powder (P015) as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). In Section 40 CFR 261.33(e) of RCRA, beryllium powder is considered hazardous when it is in the form of a “discarded commercial chemical product, off-specification species, container residue and spill residue, thereof.” This designation only applies to commercially pure products or manufacturing intermediates in which beryllium is the “sole active ingredient.” Due to the limited scope of this definition, we believe the only form of beryllium to which it applies is waste commercially pure metallic beryllium powder. Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

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#### **Section 14: Transportation Information**

There are no U.S. Department of Transportation hazardous material regulations which apply to the packaging and labeling of this product as shipped.

Beryllium Powder is regulated, UN1567, 6.1, 4.1, PG II

US DOT Information: Proper shipping name: Solid metal not regulated

IATA: Proper shipping name: Solid metal not regulated

IMO: Proper shipping name: Solid metal not regulated

Marine Pollutant: No

Canadian TDG: Solid metal not regulated

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#### **Section 15: Regulatory Information**

##### **United States Federal Regulations**

MSDS complies with OSHA’s Hazard Communication Rule 29, CFR 1910.1200.

SARA: This product is reportable under the Section 313.

SARA Title III: You may obtain additional information by calling the EPA SARA Title III Hotline.

RCRA: When recycled (used in a process to recover metals), this material is not classified as hazardous waste under federal law.

TSCA: This material is/are listed on the TSCA Chemical Substance Inventory of Existing Chemical Substances

CERCLA: Beryllium Powder: RQ 10 lb (4.54 Kg)

##### **State Regulations**

California Proposition 65: Warning! This product contains a chemical known to the state of California to cause cancer. Beryllium (7440-41-7)

California No Significant Risk Level: Beryllium CAS# 7440-41-7: No significant risk level = 0.1 µg/day

Beryllium (7440-41-7): Is listed on the following state right-to-know lists: California, New Jersey, Florida, Pennsylvania, Minnesota and Massachusetts.

##### **International Regulations**

Canada WHMIS: Beryllium: DSL, Yes; NDSL, No. WHMIS Classification: D2A, D2B

Europe EINECS Numbers: ND

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## Section 16: Other Information

Label Information: Hazard Communication regulations of the U.S. Occupational Safety and Health Administration require this product be labeled.

Following is the label which accompanies this product during shipment.

### Beryllium Solid WARNING

**INHALING DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE, A SERIOUS CHRONIC LUNG DISEASE, IN SOME INDIVIDUALS. CANCER HAZARD. OVER TIME, LUNG DISEASE AND CANCER CAN BE FATAL. TARGET ORGAN IS PRIMARILY THE LUNG.**

**READ THE MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL.**

Overexposure to beryllium by inhalation may cause chronic beryllium disease, a serious chronic lung disease.

- If processing or recycling produces airborne dust, fumes, or mists, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, machining, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne dust.
- The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational exposures. The current OSHA PELs for beryllium are 2 micrograms/m<sup>3</sup> as an 8-hour TWA, 5 micrograms/m<sup>3</sup> as a ceiling not to be exceeded for more than 30 minutes at a time, and 25 micrograms/m<sup>3</sup> as a peak exposure never to be exceeded. The OSHA limits have been in place for nearly 30 years and have not been revised in that time. The American Conference of Governmental Industrial Hygienists (ACGIH) current Threshold Limit Value (TLV)\* for beryllium is 0.05 micrograms/m<sup>3</sup> averaged over an 8-hour work shift
- Beryllium metal, in solid form and as contained in finished products presents no special health risks.
- Sold for Laboratory use only. This product can be recycled

The Occupational Safety and Health Administration requires employers to provide training in the proper use of this product.

We strongly caution against washing or cleaning Beryllium Products with acids or solvents due to the risk of forming Beryllium Salts which may be extremely toxic.

**SOLD FOR LABORATORY USE ONLY**

European Risk and Safety Phrases: ND

European symbols needed: ND

Canadian WHMIS Symbols: ND

HMIS® Hazard Rating: Health: **2**; Fire: **0**; Reactivity: **0**

Hazard Rating is for solid metal.

(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

#### **Abbreviations used in this document**

NE= Not established

NA= Not applicable

NIF= No Information Found

ND= No Data

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#### **Disclaimer**

Ted Pella, Inc. makes no warranty of any kind regarding the information furnished herein. Users should independently determine the suitability and completeness of

information from all sources. While this data is presented in good faith and believed to be accurate, it should be considered only as a supplement to other information gathered by the user. It is the User's responsibility to assure the proper use and disposal of these materials as well as the safety and health of all personnel who may work with or otherwise come in contact with these materials.

MSDS Form 0013F1 V2