



MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Beryllium
Formula: Be
Chemical Family: Metallic Element
CAS #: 7440-41-7

II HAZARDOUS INGREDIENTS

<u>Hazardous Components</u>	<u>%</u>	<u>OSHA/PEL</u>	<u>ACGIH/TLV</u>
Beryllium	0-100	.002 mg/m ³	.002 mg/m ³

Toxic Substances Control Act: Beryllium (CAS # 7440-41-7) is listed on the TSCA Chemical Substance Inventory of Existing Chemical Substances.

NIOSH RTECS#: DS1750000

III PHYSICAL DATA

Boiling Point:	2970 °C	Melting Point (°C):	1289
Density (g/cc):	1.85	Vapor Pressure:	N/A
Atomic Weight:	9.01	Evaporation Rate:	N/A
% Volatiles:	None	Solubility in H₂O:	None
Appearance and Odor:	Grey metallic, odorless		

IV FIRE AND EXPLOSION HAZARDS DATA

Flash Point (Method used): Non-combustible as a solid. Ignition occurred as a powder layer consisting of 1.0 to 5.0 micron particles between 540 °C and 700 °C. Coarser beryllium powder able to pass through a 74 micron sieve did not ignite under like testing.

Explosive limits: Not applicable to solids. As a cloud of 1.0 micron diameter powder ignition occurred at 910 °C. Beryllium powder greater than or equal to 2 microns in diameter did not ignite under like conditions. Regardless of powder size tested beryllium did not ignite as a cloud in a spark apparatus.

Extinguishing Media: As a solid, use extinguishing media appropriate to the surrounding fire. Do not use water or carbon dioxide to extinguish beryllium powder fires. As a powder, extinguish by smothering using a Class D fire extinguisher, dry sand, graphite powder, or sodium chloride.

Special Fire Fighting Procedures: If this material becomes airborne as a respirable particulate during a fire situation, pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the metal fumes.

Unusual Fire and Explosion Hazard: 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 beryllium powder or chips releasing flammable hydrogen gas which could burn and result in an explosion. Ventilation duct work which has accumulated a fine coating of

beryllium dust on its internal surface poses a potentially serious fire hazard. Extinguishing 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, etc. must not be allowed to enter the ventilation duct work. Also, duct work must be made of non-combustible material.

V HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Inhalation: An exposure to airborne beryllium in excess of the occupational standard can occur during routine handling, material transfer, chemical processing or further processing of powdered material and when machining, melting, casting, gross handling, picking, welding, grinding, sanding, polishing, milling, crushing, or otherwise abrading the surface of solid beryllium in a manner which generates finely divided particles. Machining operations conducted under a flood of liquid coolant usually require local exhaust ventilation. The cycling through a machine of liquid lubricant/coolant containing finely divided beryllium in suspension can result in the concentration building to a point where the particulate may become airborne during use. A filter, centrifuge, or settling chamber can be installed in-line if necessary. The potential for exposures also may occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Acute Effects:

Inhalation: This product is insoluble and does not cause acute health effects.

Ingestion: This product is insoluble and does not cause acute health effects.

Skin: Skin abrasion may cause irritation.

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

Chronic Effects:

Inhalation: Overexposure to airborne beryllium particulate may cause a serious lung disease, in certain sensitive individuals, called chronic beryllium disease (chronic berylliosis). Chronic beryllium disease is a condition in which the tissues of the lungs become inflamed, restricting the exchange of oxygen between the lungs and the bloodstream. Symptoms may include cough, chest pain, shortness of breath, weight loss, weakness, and fatigue. Long term effects may include loss of lung function, fibrosis, or subsequent secondary effects on the heart with eventual permanent impairment.

Ingestion: There are no known cases of illness resulting from ingestion of beryllium.

Skin: Skin abrasion may cause irritation.

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

Carcinogenic references: Hazard communication regulations of the U.S. Occupational Safety & Health Administration require that caution labels for materials listed as potential carcinogens in either the International Agency for Cancer Research Monograph Series or the National Toxicology Program Annual Report on carcinogens must contain a cancer warning. Beryllium has also been so listed based principally on animal tests and therefore this material bears a label identifying it as a potential cancer hazard.

Medical Conditions Aggravated by Exposure: Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if excessive concentrations of dust or fume are inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) system 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 excessive exposure.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. Although no cases in which a person stopped breathing as a result of exposure are known, if breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: Swallowing metal powder or dust can be treated by having the affected person drink large quantities of water and attempting to induce vomiting if conscious. Obtain medical help.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with soap and water. If irritation persists, seek medical attention.

EYE: Flush eyes with copious amounts of clean water. If irritation persists obtain medical help. Contact lenses should not be worn when working with metal dusts and powders because the contact lens must be removed to provide adequate treatment.

VI REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Oxidation will form on solid shapes when moist.

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

Hazardous Decomposition Products: Melting and dross handling or powdering operations can emit airborne dusts or fumes.

Hazardous Polymerization: Will not Occur

VII SPILL AND LEAK PROCEDURES

Steps to Be Taken in Case Material Is Released or Spilled: In solid form this material poses no health or environmental risk. If this material is in powder or dust form, 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. Cleanup should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system followed by wet cleaning methods. Special care must be taken when changing filters on HEPA vacuum cleaners when used to clean up potentially toxic materials. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Depending upon the quantity of material released, fine powder or dust spills to the environment may require reporting the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

Waste Disposal Method: Dispose of in accordance with State, Federal and Local regulations.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used. Exposure to unknown concentrations of fumes or dusts requires the wearing of a pressure-dem and self-contained breathing apparatus. Pressure-demand airline respirators are recommended for jobs with high potential exposures such as changing bags in a baghouse air cleaning device.

Ventilation: Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Powders should be stored and transported in tightly sealed containers and must only be handled under controlled ventilated conditions.

Protective Gloves: Wear gloves to prevent metal cuts and skin abrasions particularly during handling.

Eye Protection: Wear safety glasses, goggles, face shield, or welders helmet.

Other Protective Equipment: No protective equipment or clothing is required when handling solid forms. Protective overgarment or work clothing should be worn by persons who may become contaminated with dusts, fumes, or powders.

Work Practices: Vacuum or wet cleaning methods are recommended for dust removal. Be certain to de-energize electrical systems as necessary before beginning wet cleaning. Vacuum cleaners with high efficiency particulate air (HEPA) filters are the recommended type. The use of compressed air to remove dusts should be avoided as such an activity can result in unnecessary short-term elevated exposures to dusts. Contaminated work clothing and overgarment should be managed in such a manner so as to prevent secondary exposure to persons such as laundry operators and to prevent contamination to personal clothing. Never use compressed air to clean work clothing.

IX SPECIAL PRECAUTIONS

Packaging and Labeling Requirements: The following requirements of the U.S. Dept. of Transportation apply only to beryllium metal powder or dust, not to solid shapes:

Shipping Name: RQ Flammable Solid, Poisonous, N.O.S. (Beryllium Metal Powder).

NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Hazard Class: Beryllium metal powder and dust are classified as Flammable Solid and Class B Poison.
NOTE: Hazard class must be included on shipping papers.

Identification Number: UN2926
NOTE: Must be marked on shipping papers and on the outside of the shipping container.

Label(s) Required: Flammable Solid and Poison (For Beryllium Metal Powder or Dust Only).
NOTE: Place on the outside of the shipping container.

Reportable Quantity: 10 lbs. (4.54).
NOTE: The RQ is limited to particles having a diameter less than 100 micrometers.

DOT Specification Container: Suitable for Flammable Solids. Recommended double overpack when shipping powder.

Other: Emergency response information is provided within this MSDS.
NOTE: This information must be included, in some form, with the shipping papers.

SARA Title III: Beryllium is reportable under Section 313

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