



# MATERIAL SAFETY DATA SHEET

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**MANUFACTURER**

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**FOR INFORMATION**

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**I. PRODUCT IDENTIFICATION**

**PRODUCT NAME:** Beryllium & DuraBeryllium Windows, X-ray Tubes and X-ray Detectors

**II. HAZARDOUS INGREDIENTS & EXPOSURE LIMITS**

<u>HAZARDOUS INGREDIENTS</u>	<u>% by weight</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>	<u>C.A.S. NUMBER</u>
Beryllium	>90%	0.002 mg/m <sup>3</sup>	0.002 mg/m <sup>3</sup>	7440-41-7

**WARNING: Beryllium is a potential carcinogen.**

**Note:** The X-Ray windows made by MOXTEK do not under normal conditions, represent an inhalation, ingestion or contact health hazard. Exposure limits are not applicable to the X-Ray windows during normal, intended use. Refer to section V. for conditions that could cause harmful exposures to Beryllium.

**III. PHYSICAL PROPERTIES (Beryllium)**

Atomic Number:	4	Odor:	None
Atomic Weight:	9.01	Vapor Density (air=1):	NA
Boiling Point:	2970°C	Vapor Pressure (mmHg):	NA
Evaporation Rate:	NA	% Volatiles By Volume:	None
Color:	Gray Metallic	Melting Point:	1278°C
Physical State:	Solid	Radioactivity:	NA
Density (g/cc):	1.85	Solubility in Water:	None
Chemical Family:	Metal		<b>NA=Not Applicable</b>

**IV. FIRE, EXPLOSION, AND REACTIVITY INFORMATION**

Flash points and explosive limits are not applicable to X-Ray windows, Tubes or Detectors

<b>Extinguishing Media</b>	Only in powder or other finely divided form does beryllium present a special fire problem. To Extinguish a metal powder fire; use Class D fire extinguishing powder.
<b>General Reactivity</b>	This material is stable.
<b>Incompatibility</b> (Materials to avoid)	Avoid contact with mineral acids and oxidizing agents which may generate hydrogen gas. Hydrogen gas can be an explosion hazard.

**V. HEALTH HAZARD INFORMATION**

**PRIMARY ROUTES OF EXPOSURE**

**INHALATION:** An exposure to airborne beryllium in excess of the occupational standard can occur when machining, melting, casting, gross handling, pickling, welding, grinding, sanding, polishing, milling, crushing, or otherwise abrading the surface of solid beryllium in a manner which generates finely divided particles.

**INGESTION:** There are no known cases of illness resulting from ingestion of beryllium. As a standard hygiene practice after handling Beryllium, hands should be washed before eating or smoking.

**SKIN:** This product is in an insoluble form and does not pose a potential for an allergic dermal response or skin absorption and can be safely handled with bare hands. See Section VI for additional information.

**EYES:** Injury to the eyes can result from particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate. Exposure may result from direct contact with airborne particulate (chips or dust) or contact to the eye of contaminated hands or clothing.

**ACUTE** (immediate or short-term health effects): This product is insoluble and does not cause acute health effects.

**CHRONIC** (long-term health effects): Over exposure 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.

**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 of the National Toxicology Program Annual Report on carcinogens must contain a cancer warning. Beryllium has been so listed principally on animal tests and therefore, as shipped by MOXTEK, this material bears a label identifying it as a potential cancer hazard.

## **VI. EMERGENCY AND FIRST AID PROCEDURES**

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**INHALATION:** Breathing difficulty caused by inhalation of dust or fumes requires immediate removal 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:** Skin cuts and abrasions can be treated by standard first aid. Skin contamination with dust or powder can be removed by washing with soap and water. If irritation persists obtain medical help. Accidental implantation of this material beneath the skin requires it to be removed to prevent infection or development of a corn-like lesion.

**EYES:** Dust or powder should be flushed from the 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.

## **VII. OCCUPATIONAL CONTROL MEASURES**

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**PROTECTIVE EQUIPMENT:** No protective equipment or clothing is required when handling the X-Ray windows or Grids.

**RESPIRATORY PROTECTION:** Not required when the product is used for its intended purpose. When processing produces dust or fumes use exhaust ventilation or other controls designed to meet OSHA standards. Respirators must be used as specified by an Industrial Hygienist or other qualified professional.

As a good safety practice, wear safety glasses while handling the X-Ray windows or Grids.

## **VIII. ENVIRONMENTAL PROTECTION INFORMATION**

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**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:** In solid form this material poses no health or environmental risk.

**SOLID WASTE MANAGEMENT:** The U.S. Environmental Protection Agency has classified beryllium dust (P015) as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). In section 40 CFR 261.33(e) of RCRA, beryllium dust is considered hazardous when it is in the form of a "discarded commercial chemical product, off-specification species, container residue and spill residue, thereof." It is our understanding 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 metallic beryllium dust in the form of commercially pure metallic beryllium powder.

Beryllium scrap, chips and powder are normally recycled. In cases where this is not justified, we recommend any off-specification metallic beryllium dust or powder be sealed within two plastic bags and then placed within a DOT container approved for flammable solids. The outer container must be labeled with the appropriate EPA hazardous waste label and DOT hazard warning label(s) and shipped under a uniform hazardous waste manifest to an approved hazardous waste management facility.

## **IX. PACKAGING AND LABELING REQUIREMENTS**

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

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration require that this material be labeled.