

# Beryllium Hazards in the Electrical Industry

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# We have been trained to recognize Electrical Hazards

- ▶ We know the severe consequences of the electrical hazards:
  - Electrical shock, electrocution
  - Burns caused by Arc flash.



- ▶ Beware other hazards may exist - one of them may be...

**Beryllium.**



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# What is Beryllium (Be)?

- ▶ A silver gray metallic element that occurs naturally in 45 minerals
- ▶ An element with high permeability (transparency) to X-rays
- ▶ Machinable to close tolerances
- ▶ 6 times stronger than steel
- ▶ 1/3 the weight of aluminum
- ▶ Nonmagnetic.



# Where is Be used?

Be has been produced for various industrial uses since the 1950's:

- ▶ Aerospace, defense, telecommunications
- ▶ Biomedical, dental, laboratory work, R&D
- ▶ Automotive, fire prevention, sports equipment
- ▶ Electrical, electronics, recycling, D&D industry.



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# Where is Be used in the electrical industry?

Beryllium is used in some but not all:

- ▶ Large electric motors, power transformers, disconnects
- ▶ Circuit breakers, wire, starters, switchgear, cranes,
- ▶ Electrodes, springs, acoustic components, lasers
- ▶ Computers, connectors, load cells, screws, bolts
- ▶ Washers, bearings, roll pins, retaining rings.



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# Why is Be used?

- ▶ Strength, stiffness, light weight, non-sparking
- ▶ Springiness, electrical conductivity, antigalling
- ▶ Castability, dimensional stability, formability
- ▶ Heat conductivity, wear resistant, corrosion resistant
- ▶ Neutron moderator.



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# Why be concerned?

- ▶ “Workers exposed to particles, fumes, or solutions from beryllium containing materials may develop chronic beryllium disease (CBD), a potentially disabling or even fatal respiratory disease.” (NIOSH Alert, January 2008)

**Preventing exposures is key in preventing CBD!**



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# How does exposure occur?

- ▶ Inhaling dusts, fumes, or mists that contain Be
- ▶ Allowing Be dusts or solutions to contact the skin

**Normal installation does not create  
an exposure hazard!**



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# What activities create exposure hazards?

- ▶ Grinding, cutting, polishing, welding, drilling, sanding, machining, refurbishing, etc.
- ▶ Working on machine shop equipment
- ▶ Performing maintenance and modification activities
- ▶ Repairing/replacing equipment damaged from an Arc flash that contained Be alloys [**significant exposure hazard**]



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# How many are affected by Be exposure?

**Total affected(BeS & CBD) for Hanford site,  
including PNNL:**

▶ Number that are affected	145
▶ Number of Chronic Beryllium Disease	34
▶ Affected in the Electrical trade	21



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# What are the key safe work habits?

- ▶ Know the content of the materials in the workplace
- ▶ If the equipment uses a Be alloy:
  - Plan the job using appropriate PPE
  - Do not use compressed air for cleaning
  - Avoid generating dust/fumes/mists or other aerosols
  - Follow good personal hygiene practices
  - Maintain excellent housekeeping: don't dry sweep
  - Use only HEPA-type vacuum



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# In Closing...

- ▶ **Beryllium is used in some but not all types of electrical equipment.**
- ▶ **Know the content of the material/equipment you are using.**
- ▶ **Normal installation does not create an exposure hazard!**
- ▶ **Preventing beryllium exposures is the key to preventing CBD!**



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