

Safety Practices for the Chemical Processing of Small Copper Beryllium Alloy Parts

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Copper beryllium alloys are stamped into a variety of shapes, sizes and designs for use in electrical and electronic equipment. Copper beryllium parts can be further processed in secondary finishing and chemical operations such as cleaning, etching and plating. Copper beryllium alloys can be safely processed using the methods and controls commonly utilized in these secondary finishing and chemical operations.

In an effort to quantify the potential for worker exposure to airborne beryllium, a case study was conducted at four precision stamping facilities processing copper beryllium. These facilities performed a variety of chemical operations during the manufacture of copper beryllium containing components for the electronic industry. The study found that Ninety-six percent (96%) of the 49 samples obtained during chemical processing operations were below the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 0.2 microgram beryllium per cubic meter of air ($\mu\text{g}/\text{m}^3$), measured as an 8-hour time weighted average (TWA). The PEL was not exceeded in facilities with good housekeeping practices. The two samples that exceeded 0.2 $\mu\text{g}/\text{m}^3$ were observed at a bright cleaning operation at a single facility and were attributed to poor housekeeping (see Housekeeping section below). The following is a summary of the results:

	Number of Sample Observations	Number of Samples Greater than 0.2 $\mu\text{g}/\text{m}^3$
Chemical Processes		
• Bright Cleaning	14	2
• Open Tank Plating	10	0
• Enclosed Plating	11	0
• Photo-Etching	5	0
• Wastewater Treatment	9	0

WORK PRACTICES & CONTROL MEASURES

The chemical processing of small copper beryllium alloy parts requires a combination of the following control measures:



Local Exhaust Ventilation

- Where copper beryllium is chemically cleaned by corrosive processes using acids or bases, local exhaust ventilation must be installed to minimize the escape of mists or vapors into the workplace.
- The discharge of air from an air cleaning system into the work place air is not recommended due to the potential for exposure if there were a failure of the filtration system. The system should be designed and operated in accordance with commonly accepted ventilation principles and pertinent environmental regulations.
- For additional information, refer to Safety Facts SF9 "Ventilation of Beryllium Dust Generating Operations".



Housekeeping

- Chemical solutions used in the cleaning and processing of copper beryllium must be contained to prevent splashing onto floor areas, external structures or operators' clothing.
- Chemical solutions that splash outside the process containers should be cleaned up and must not be allowed to dry because it may carry with it particulate containing beryllium which can later become airborne or attach to clothing or shoes.



Maintenance

- Contaminated equipment should be thoroughly cleaned prior to performing service and maintenance.
- Residue may deposit on the internal surfaces of ventilation enclosures and equipment structures. The residue must be removed, kept wet or otherwise controlled during maintenance and service activities to minimize airborne generation of particles.
- Detailed procedures for safely maintaining the process equipment and ventilation systems should be developed.

- All operators and maintenance personnel need to be trained in the established procedures prior to performing maintenance or service activities. The procedure should detail the use of wet methods or vacuuming, ventilation, and appropriate personal protective equipment required to prevent exposure to airborne particles.



Workplace Exposure Characterization

- In accordance with good industrial hygiene practice, a characterization of worker exposure, including air monitoring, should be conducted for operations where a potential for beryllium exposure exists.



Recycling

- Copper beryllium scrap should be kept segregated from other metals to retain its higher value as a recyclable material.
- Materion Brush Inc. purchases clean, segregated copper beryllium scrap. **Call 800-BUY-BECU (800-289-2328) to discuss the sale of copper beryllium scrap.**



Disposal

- Copper beryllium wastes are not considered hazardous under federal regulations.
- Some copper beryllium alloy products may contain regulated substances such as lead or may be coated or plated with metals that could cause the scrap to be regulated as hazardous waste when disposed.
- 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.



ADDITIONAL INFORMATION

Handling copper beryllium in solid form poses no special health risk. Like many industrial materials, beryllium-containing materials may pose a health risk if recommended safe handling practices are not followed. The inhalation of dust, mist or fume containing beryllium can cause a serious lung condition in some individuals. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. In addition, processing copper beryllium alloys shall be conducted in accordance with the Beryllium Standard for General Industry (29 CFR 1910.1024) established by OSHA which includes a PEL of 0.2 µg/m³ as an 8-hour TWA, a Short-Term Exposure Limit (STEL) of 2.0 µg/m³ determined over a 15-minute sampling period and ancillary requirements prompted at an Action Level (AL) of 0.1 µg/m³ or other specified situations.

In assessing the need for controls at your facility, you should not rely solely on the information presented since conditions may differ between precision stamping facilities using chemical processing operations. If you have concerns about conditions in your work area, contact a qualified industrial hygienist to perform a process evaluation. Materion Brush Inc. has provided training to nearly 100 industrial hygiene consultants across the U.S. in hazard recognition and control of beryllium manufacturing operations. To obtain a list of consultants nearest you, call the Materion Brush Inc. Product Safety Hotline listed below or access our web site at www.materion.com.

If precision stamping operations are utilized to form the small copper beryllium alloy parts, refer to Safety Facts SF103, "Safety Practices for Precision Stamping Copper Beryllium Alloys".

The information contained in this Safety Facts applies only to the subject referenced in the title. Health and safety hazards associated with the chemicals and equipment used in the chemical operations are not addressed as part of this Safety Facts. You must read the Safety Data Sheet (SDS) specific to the products in use at your facility for more detailed environmental, health and safety guidance. Safety Data Sheets for Materion Brush Inc. products can be obtained by calling the Product Safety Hotline listed below or by accessing our web site at www.materion.com. If you need more information, contact your local Materion Brush Inc. representative or:

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