BERYLLIUM EXPOSURE STANDARDS

Occupational - Various organizations set standards for occupational exposure limits to beryllium. The United States Occupational Safety and Health Administration, or OSHA has established standards that limit the amount of airborne beryllium particles to which a person may be exposed. California OSHA has also established standards that limit the amount of airborne beryllium particles to which a person may be exposed. The National Institute for Occupational Safety and Health (NIOSH) is a scientific body which recommends occupational exposure limits to many substances.

<table>
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<th>Beryllium</th>
<th>OSHA</th>
<th>California OSHA</th>
<th>NIOSH</th>
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<td></td>
<td>PEL</td>
<td>CEILING</td>
<td>PEAK</td>
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<td>0.002</td>
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ALL CONCENTRATIONS ARE IN MILLIGRAMS PER CUBIC METER OF AIR

PEL = Eight-Hour Time Weighted Average Permissible Exposure Limit (OSHA)
OSHA CEILING = Not To Be Exceeded Except For Peak Limit (OSHA)
Cal OSHA CEILING = Not To Be Exceeded At Any Time (California OSHA)
PEAK = 30-Minute Maximum Duration Concentration Above Ceiling Limit (OSHA)
NIOSH = National Institute for Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
REL = Eight-Hour Time Weighted Average Recommended Exposure Limit (NIOSH)

These standards are very low and are independent of particle size or chemical form. The small amounts of beryllium involved cannot be detected with the unaided eye. To give you an idea of how much beryllium 0.002 milligrams per cubic meter is, imagine building a box 6 feet high, the size of a football field. Take an amount of pure metallic beryllium powder about the size of a pencil tip and imagine it dispersed evenly throughout the air inside this box. This amount of beryllium in the air is so small there is no way to detect it by sight, taste or smell. Therefore, any uncontrolled visible airborne beryllium-containing dust emission does indicate a serious problem and immediate corrective action must be taken. Materion Brush Inc. recommends following good industrial hygiene practice which includes reducing airborne exposures to the lowest feasible level for all product constituents. Materion Brush Inc. recommends that users of beryllium-containing materials maintain worker exposures to airborne beryllium to levels reliably below its recommended exposure guideline (REG) of 0.0002 milligrams beryllium per cubic meter of air.

Users of beryllium-containing materials are encouraged to perform workplace exposure characterization, including air monitoring, to determine if conditions or situations exist which dictate the need for additional industrial hygiene and improved work practices. Through the use of the Beryllium Worker Protection Model, Materion Brush Inc. encourages those handling beryllium and beryllium-containing materials in ways which generate particulate containing beryllium to utilize engineering and work practice controls to keep beryllium work areas clean and to keep particulate containing beryllium out of the lungs, off the skin, off of clothing, in the work process, in the work area and on the plant site, and to keep beryllium workers prepared to work safely. This includes limiting the total number of persons potentially exposed by minimizing the number of persons working with beryllium and restricting the entry of persons into beryllium work areas to those who have a business need.
To assist users of beryllium-containing materials, Materion Brush Inc. has developed an “Interactive Guide to Working Safety with Beryllium and Beryllium-containing Materials” (Interactive Guide) to provide employers and employees with specific information on the elements of the Beryllium Worker Protection Model. The Interactive Guide is available on CD and operates from most personal computers. The Interactive Guide provides an important foundation for the safe handling of beryllium and beryllium-containing materials in the workplace. Copies of the Interactive Guide can be obtained through our website, www.materion.com, by contacting the Materion Brush Inc. Product Safety Hotline at (800) 862-4118, or by contacting a Materion Brush Inc. Sales Representative.

Environmental - The National Emission Standard for beryllium is 0.01 micrograms per cubic meter (30-day average) in ambient air for those production facilities which have been qualified to be regulated through ambient air monitoring. Other facilities must meet a 10 gram per 24-hour total site emission limit. Foundries melting alloys containing beryllium are subject to the National Emission Standard for Beryllium as promulgated by EPA (40 CFR 61, Subpart C). Facilities machining alloys containing 5% beryllium or less by weight are not subject to the National Emission Standard for beryllium. Most process air emission sources will require an air permit from a local and/or state air pollution control agency. The use of air cleaning equipment may be necessary to achieve the permissible emission. Tempered makeup air should be provided to prevent excessive negative pressure in a building. Direct recycling of cleaned process exhaust air is not recommended. Plant exhausts should be located so as not to re-enter the plant through makeup air or other inlets. Regular maintenance and inspection of air cleaning equipment and monitoring of operating parameters is recommended to ensure adequate efficiency is maintained.

ADDITIONAL INFORMATION
The information contained in this Safety Facts applies only to the subject referenced in the title. Read the MSDS specific to the products in use at your facility for more detailed environmental, health and safety guidance. MSDSs can be obtained by contacting the Materion Brush Inc. Safety Hotline at (800) 862-4118 or visit our website at www.materion.com.

Additional information can also be obtained by contacting a Materion Brush Inc. Sales Representative or:

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