

# <sup>4</sup>Be Responsible

Beryllium Product Stewardship

## BERYLLIUM-CONTAINING MATERIALS

# WELDING EXPOSURE CONTROL GUIDE



Beryllium Science & Technology Association

Avenue Marnix 30, 1000 Brussels

Tel: +32 (0)2 213 74 20

Email: [info@beryllium.eu](mailto:info@beryllium.eu)

[www.beryllium.eu](http://www.beryllium.eu)

## BERYLLIUM (BE) – CONTAINING ALLOYS

Beryllium-containing alloys, in solid form and as contained in finished products present no special health risks.



However, some manufacturing operations are known to generate airborne particulate and like many industrial materials, welding of beryllium-containing alloys present a health risk if effective controls are not implemented.

The inhalation of beryllium-containing dust, mist or fume can cause a serious lung condition in some individuals. The degree of hazard varies depending on the form of the product and how the material is processed and handled. You must read the product specific Safety Data Sheet (SDS) for additional environmental, health and safety information before working with any beryllium-containing alloys.

The use of engineering and work practice controls are the preferred methods of controlling exposure to beryllium-containing particulate reliably below the Recommended Exposure Guideline (REG) of 0.6 microgram of beryllium per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) (inhalable), measured as an 8-hour time weighted average (TWA) or the occupational exposure limit (OEL) applicable to the Member State for airborne beryllium.

The welding of beryllium-containing alloys, base materials or fillers indoors, outdoors, or in confined spaces should be done using local exhaust ventilation and pressure-demand airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations. In all cases, workers in the immediate vicinity of the welding or cutting operations should be protected as necessary by local exhaust ventilation or airline respirators.



## EXHAUST VENTILATION

Local exhaust ventilation (LEV) is the preferred control technology. During welding operations, LEV is required to prevent airborne exposure to beryllium-containing fume and slag particulate.

A back-draft ventilation welding enclosure used to weld other metals can often control beryllium exposures while welding. If the welded parts are abrasively cleaned, ventilation must be provided to prevent airborne generation of beryllium-containing particulate during the cleaning operations.

Resistance spot welding involving beryllium-containing alloys typically require no extra ventilation since the weld nugget is small and is not exposed.

Where utilized, exhaust inlets to the ventilation system are generally positioned as close as possible to the source of generated airborne particulate. The type and capacity of the LEV will depend on the material being welded and the welding process.

As part of the ventilation equipment, process exhaust air should be directed through a High Efficiency Particulate Air (HEPA) filtering device to the outdoors where it will not be recirculated back to the work area.

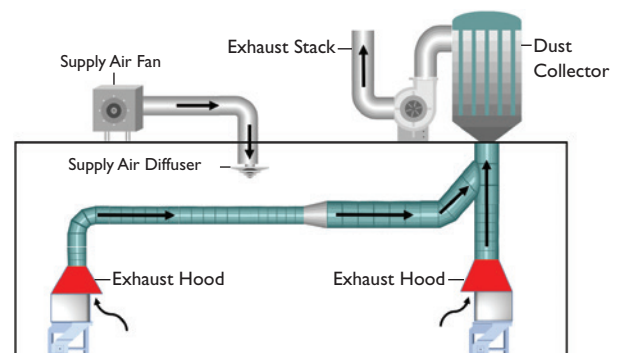
Ventilation equipment must be inspected regularly to ensure it is functioning properly. Provide training on the use, operation and maintenance of ventilation systems to all users.



WELDING HOOD



GRINDING HOOD



## MAINTENANCE

Under certain conditions the repair or maintenance of equipment can generate airborne 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 procedures should detail the use of wet methods or HEPA vacuuming, ventilation and appropriate PPE to prevent exposures to airborne particles.



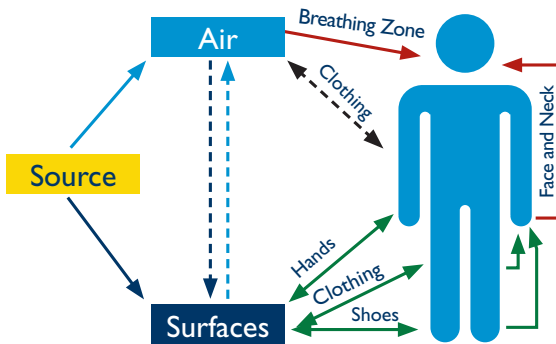
## HOUSEKEEPING

Welding and grinding of welds can deposit fine dust containing beryllium on the surface of welded parts. Fabricated parts should be kept clean between processing steps to avoid potential re-suspension of fine particles into the air. The use of compressed air or brooms for cleaning should be prohibited. Wet cleaning and vacuuming are effective methods for cleaning. Disposable rags, towels or wipes should be used to wet clean, not be allowed to dry out and must be kept in a closed container. Rags and towels should not be reused.



## 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.



## PERSONAL PROTECTIVE EQUIPMENT (PPE)

When engineering and/or work practice controls are not practical or effective, personal protective equipment (PPE) must be used to prevent skin contact and inhalation of beryllium-containing particulate. Instruct operators to wear gloves when handling parts that are not visibly clean.

Ensure that work clothing, e.g. pants and shirts, are maintained in a visibly clean condition when there is potential for contact with beryllium-containing particulate or solutions.

When airborne exposures exceed or have the potential to exceed REG or OEL, approved respirators must be used as specified by an industrial hygienist or other qualified professional.



## RECYCLING / DISPOSAL

Beryllium-containing scrap should be kept segregated from other metals to retain its higher value as a recyclable material. Beryllium wastes are not considered hazardous under EU regulations. Some beryllium products contain specific metals (e.g. chromium, lead) that are regulated materials.



## ADDITIONAL INFORMATION

Additional worker protection guidance can be obtained online at [www.beryllium.eu](http://www.beryllium.eu) or by contacting the **Beryllium Science & Technology Association (BeST)** at: Avenue Marnix 30, 1000 Brussels, Tel: +32 (0)2 213 74 20 | Email: [info@beryllium.eu](mailto:info@beryllium.eu)

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