

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

## MAINTENANCE

Under certain conditions the repair or maintenance of equipment can generate airborne particles. Protecting workers can require the use of specific work practices or procedures involving the combined use of ventilation, wet and vacuum cleaning methods, respiratory protection, decontamination, special protective clothing and when necessary, restricted work zones. 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.



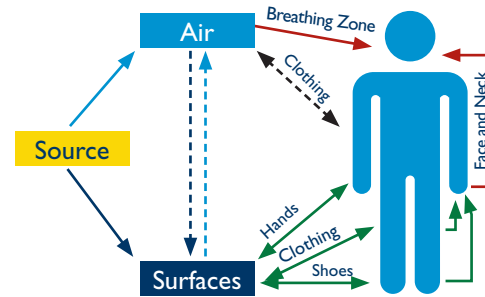
## HOUSEKEEPING

Sanding, grinding, lapping or polishing can deposit fine dust containing beryllium on the surface of fabricated parts and machine surfaces. 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. Special care must be taken when using polishing or lapping compounds. The compounds should not be reused due to the potential for cross contamination to other materials. The used compounds should not be allowed to dry out, during or after the completion of the job.



## 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 / DISPOSAL

Beryllium-containing scrap is a valuable material and should be recycled whenever possible. Beryllium-containing scrap should be kept segregated from other metals to retain its higher value as a recyclable material.



If not recyclable, materials containing beryllium are considered waste and must be disposed in accordance with applicable EU and Member State regulations. Beryllium-containing wastes should be maintained in a moist condition during collection, storage and disposal, double bagged in plastic and sealed in an appropriate container to minimize the potential for release and exposure.

## 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: Rue Belliard 40, 1040 Brussels, Tel: +32 (0)2 213 74 20 | Email: [info@beryllium.eu](mailto:info@beryllium.eu)

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# <sup>4</sup>Be Responsible

Beryllium Product Stewardship

## BERYLLIUM-CONTAINING MATERIALS SANDING, GRINDING, BUFFING & POLISHING EXPOSURE CONTROL GUIDE



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## 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, sanding, grinding, buffing, lapping and polishing 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 BeST 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.

## WET METHODS

The proper use of machining fluids is usually an effective method for reducing the airborne generation of beryllium containing particles. The machining fluids are used to lubricate and cool the cut and to flush away the resulting swarf.



HIGH SPEED SURFACE GRINDING

The containment and flooding of swarf helps minimize the release of airborne particulate. Care should be given to lubricant containment and to prevent splashing onto the floor areas or operators' clothing. Inadequate machining fluid flow and higher tooling speeds may require additional containment and ventilation controls. The recycling of machining fluids containing finely divided beryllium particles in suspension can result in the buildup to a point where particles may become airborne during use. Machining fluids should be filtered or changed regularly to reduce the accumulation of beryllium-containing particulate.

## EXHAUST VENTILATION

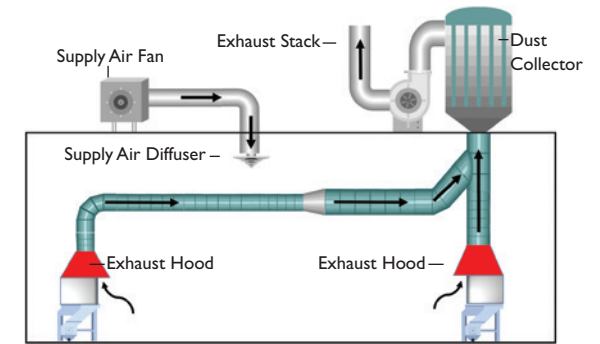
Local exhaust ventilation (LEV) is required when coolants or lubricants are not being used or are not effective in controlling the release of airborne particulate and where there is potential for worker exposure. Where utilized, exhaust inlets to the ventilation system are generally positioned as close as possible to the source of generated airborne particulate. The type and capacity of the LEV will depend on the speed of the particle generation. Some operations (hand grinding, roto tools) are difficult to control due to the random nature of the particle generation. These operations should be conducted in a ventilated enclosure designed to contain all particulate within the enclosure and away from the operator's breathing zone.



LEV GRINDING HOOD

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.



## SPEEDS / FEEDS / TOOLING

These machining variables must be considered when determining work practice and engineering controls. Feed stock rates can be an important factor in determining whether a process will generate airborne particles. Sharp-tooled machining processes generally produce only large chips, while dull tooling may produce a mixture of large and small chips. Strict control of process speeds / feeds and tooling condition will assist in reducing airborne particle generation.



## 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.