

# <sup>4</sup>Be Responsible

Beryllium Product Stewardship

## BERYLLIUM-CONTAINING MATERIALS EXPOSURE ASSESSMENT 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, like many industrial materials, beryllium-containing alloys present a health risk if handled improperly.

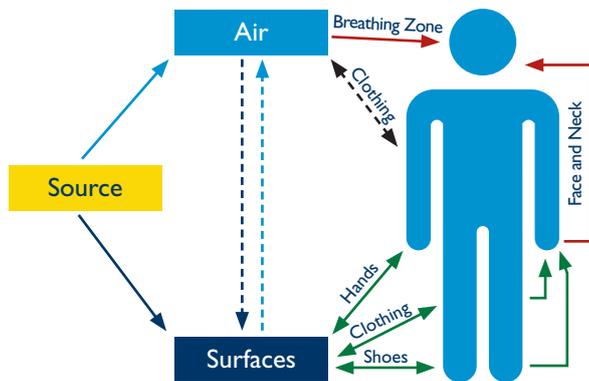


The inhalation of beryllium-containing dust, mist or fume can cause a serious lung condition in some individuals. The degree of hazard varies depending on the form of the product and how the material is processed and handled. You must read the product specific Safety Data Sheet (SDS) for additional environmental,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

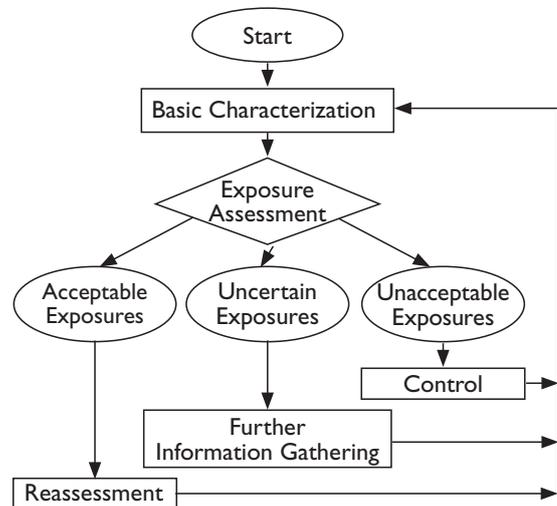
Users of beryllium-containing materials need to perform work-place exposure assessments, including air monitoring, to determine if workers airborne exposures are maintained reliably below the BeST Recommended Exposure Guideline (REG) of 0.6 microgram of beryllium per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) (Inhalable) or the occupational exposure limit (OEL) applicable to the Member State for airborne beryllium.

The main goal of the exposure assessment is to determine if exposure profiles are “acceptable”, “uncertain”, or “unacceptable”. When the exposure profile is “uncertain” or “unacceptable”, additional work practice, engineering and personal protective equipment controls are required.

### EXPOSURE ASSESSMENTS



Exposure assessment is the process of estimating or measuring the concentration, how long and how often exposure occurs to an agent, such as beryllium. Ideally, it describes the sources, pathways, routes, and the uncertainties in the potential for exposure. Both qualitative and quantitative exposure assessments should be performed.



Source: American Industrial Hygiene Association (AIHA); “A Strategy for Occupational Exposure Assessment”

## QUALITATIVE EXPOSURE ASSESSMENT

Begin with a basic characterization of the use of beryllium-containing materials in the workplace. Some questions to be answered include:

- Where is it processed?
- What processes are involved?
- How much and how often is it processed?
- What are the processing tasks?
- Are any processing tasks in the “Likely Inhalation Concern” category?
- What are the service and maintenance tasks?
- Is there a potential for skin contact with beryllium-containing particulate?

### Likely Inhalation Hazard Operations

Abrasive Blasting	Laser Cutting
Abrasive Processing	Laser Machining
Abrasive Sawing	Laser Scribing
Annealing	Laser Marking
Brazing	Laser Welding
Bright Cleaning	Laundering
Brushing	Melting
Buffing	Photo-Etching
Burnishing	Pickling
Casting	Point and Chamfer
Centerless Grinding	Polishing
Chemical Cleaning	Process Ventilation
Chemical Etching	Maintenance
Chemical Milling	Resistance Welding
Coolant Management	Roller Burnishing
Deburring (grinding)	Sand Blasting
Destructive Testing	Sand Casting
Dross Handling	Sanding
Electrical Chemical Machining (ECM)	Scrap Management (Clean)
Electrical Discharge Machining (EDM)	Sectioning
Electron Beam Welding (EBW)	Slab Milling
Forging	Soldering
Grinding	Solution Management
Heat Treating (in air)	Spot Welding
High Speed Machining (>10,000 rpm)	Sputtering
Honing	Swaging
Hot Forging	Torch cutting (i.e., oxy-acetylene)
Hot Rolling	Water-jet Cutting
Investment Casting	Welding (ARC, TIG, MIG, etc.)
Lapping	Wire Electrical Discharge Machining (WEDM)

## QUANTITATIVE EXPOSURE ASSESSMENT

Quantitative exposure assessments are conducted by a qualified industrial hygienist who implements best industrial hygiene practices for personal airborne exposure monitoring. The goal of quantitative exposure assessment is to understand the airborne exposure profile, which is an estimate of the exposure intensity and how it varies over time.

### The quantitative exposure assessment should answer the following questions for each Similar Exposure Group (SEG):

- What is the airborne beryllium exposure profile (e.g. max, min, average, inferential statistics)?
- How does the airborne beryllium exposure profile compare to the REG?
- Is the exposure profile “Acceptable” (e.g. airborne beryllium exposure is reliably below the REG).
- Is the exposure profile “Uncertain”? (e.g. need more information and additional air samples to make final judgement).
- Is the exposure profile “Unacceptable”? (e.g. airborne beryllium exposure exceeds or is likely to exceed the REG).



### What should I do if the exposure profile is “uncertain” or “unacceptable”?

1. Consider what immediate actions are necessary to protect personnel from exposure.
2. Contact an occupational health professional for consultation. This professional will be able to assist you in determining your need for the following:
  - Work practice analysis
  - Respiratory protection
  - Training
  - Clothing and skin protection
  - Migration control
  - Exposure assessment
  - Engineering controls
  - Housekeeping procedures

BeST recommends using a comprehensive program, including worker training, engineering and work practices, to control airborne beryllium-containing particulate emissions and keep beryllium work areas clean. It is also important to keep beryllium-containing particulate out of the lungs, off the skin, off of clothing, in the work process, in the work area and on the plant site to reduce risk of adverse health effects.

## 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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