

## Protecting Workers from Exposure to Beryllium and Beryllium Compounds: Final Rule Overview

### Background

Beryllium and beryllium compounds are important materials used in the aerospace, electronics, energy, telecommunication, medical, and defense industries. However, beryllium is a highly toxic metal and workers who inhale beryllium are at an increased risk of developing chronic beryllium disease (CBD) or lung cancer.

The U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) has finalized new beryllium standards for general industry, construction, and shipyards that provide commonsense, affordable, and flexible strategies for employers to protect workers from these serious risks. These rules are based on review of peer-reviewed scientific evidence, a model standard developed by industry and labor, current consensus standards, and an extensive public outreach effort that included a public comment period and public hearings.

Compared to other OSHA health standards, the beryllium rule covers a relatively small worker population of approximately 62,000 workers. OSHA estimates that each year the final rule will save the lives of 90 workers from beryllium related diseases and prevent 46 new cases of chronic beryllium disease once its full effects are realized.

### What is beryllium?

Beryllium is a lightweight but extremely strong metal used in the aerospace, electronics, energy, telecommunications, medical, and defense industries. Beryllium-copper alloys are widely used because of their electrical and thermal conductivity, hardness, and good corrosion resistance. Beryllium oxide is used to make ceramics for electronics and other electrical equipment because of its heat conductivity, high strength and hardness, and good electrical insulation.

*In general industry, exposure to beryllium can occur in the following industries and activities:*

- Beryllium Production
- Beryllium Oxide Ceramics and Composites
- Nonferrous Foundries
- Secondary Smelting, Refining, and Alloying
- Precision Turned Products
- Copper Rolling, Drawing, and Extruding
- Fabrication of Beryllium Alloy Products
- Welding
- Dental Laboratories

In construction and shipyards, exposure to beryllium primarily occurs when abrasive materials that contain trace amounts of beryllium (<1% by weight) are used in abrasive blasting operations.

### What are the health effects associated with beryllium exposure?

Workplace exposure to beryllium and beryllium compounds can result in the following:

**Chronic Beryllium Disease (CBD)** is a serious pulmonary disease that can cause serious debilitation or death. Signs and symptoms of CBD can include shortness of breath, an unexplained cough, fatigue, weight loss, fever, and night sweats. Some workers may develop severe symptoms very quickly, while others may not experience signs and symptoms until months or years after their exposure to beryllium. CBD can continue to progress even after a worker has been removed from exposure. An individual must become sensitized to beryllium through inhalation or skin exposure before he or she can develop CBD.

**Lung cancer** is associated with occupational exposure to beryllium by inhaling beryllium-containing dust, fumes or mist. The International Agency for Research on Cancer (IARC) lists beryllium as a Group 1 carcinogen (causes cancer in humans), and the National Toxicology Program (NTP) lists beryllium as a known human carcinogen.

### **The need for new beryllium standards**

- The health dangers of beryllium exposure have been known for decades. OSHA's current permissible exposure limit (PEL) for beryllium is both outdated and ineffective for preventing disease.
- Over the decades since OSHA adopted the current PEL, a consensus has developed around the science supporting the need for greater protection for workers. Many employers, including the U.S. Department of Energy, are already implementing the necessary measures to protect its workers from beryllium exposure.
- The technology for most employers to meet the new standards is widely available and feasible.

### **How will the new rule protect workers?**

- The rule reduces the PEL for beryllium to 0.2 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) averaged over 8 hours, and establishes a short-term exposure limit (STEL) for beryllium of 2.0  $\mu\text{g}/\text{m}^3$  over a 15-minute sampling period. Employers must use engineering and work practice controls to prevent excessive beryllium from becoming airborne where workers can breathe it in.
- Employers must limit access to high-exposure areas, provide respiratory protection when necessary, and provide personal protective clothing when high exposures or dermal contact is possible.
- Employers must assess exposures, develop and implement written exposure control plans, and provide workers with training specific to beryllium.

- Employers must offer medical examinations to certain exposed workers. If a specified beryllium-related health effect is identified, they must offer additional workplace accommodations to the worker to reduce beryllium exposures.

### **How will OSHA help employers comply and protect their workers?**

The rule provides staggered compliance dates to ensure that employers have sufficient time to meet the requirements and get the right protections in place. Employers have:

- One year after the effective date of the rule to implement most provisions of the standard;
- Two years after the effective date to implement the requirements for change rooms and showers, and;
- Three years after the effective date to implement the engineering control requirements.

### **Additional information**

Additional information on OSHA's beryllium rule can be found at [www.osha.gov/beryllium](http://www.osha.gov/beryllium). OSHA can provide extensive help through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. [OSHA's On-site Consultation Program](#) offers free and confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-OSHA (6742) or visit [www.osha.gov/consultation](http://www.osha.gov/consultation).

Twenty-eight states and territories operate their own occupational safety and health state plans approved by OSHA. State plans are required to have standards that are “at least as effective” as OSHA’s standards, and may have different or additional requirements. To locate an OSHA-approved state plan, visit [www.osha.gov/stateplans](http://www.osha.gov/stateplans).

For more information on this and other health-related issues impacting workers, to report an emergency, fatality, inpatient hospitalization, or to file a confidential complaint, contact your nearest OSHA office, visit [www.osha.gov](http://www.osha.gov), or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

**This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.**



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