

# Health Effects of Exposure to Beryllium

This fact sheet provides information on the primary health effects associated with exposure to beryllium and emphasizes using medical screening to identify beryllium disease in workers.

Beryllium is a lightweight metal used primarily in alloys to add strength, thermal stability and other properties valued in the aerospace and defense industries. Workers can develop adverse health effects from breathing beryllium in dust, mist, fumes, or in other forms, or through skin contact with beryllium particulate, fumes or solutions. Employers **must** reduce exposure to this toxic substance to or below the OSHA permissible exposure limit (PEL) of 2.0 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) averaged over 8 hours through feasible engineering and work practice controls. Employers **must** also provide workers with adequate personal protective equipment (PPE) to prevent skin contact with beryllium particulate, fumes or solutions.

**Chronic Beryllium Disease (CBD)** is a chronic granulomatous lung disease caused by inhalation of airborne beryllium by individuals who have been previously sensitized to beryllium (see below). Workers can develop chronic beryllium disease (also known as berylliosis) from exposure to airborne beryllium even at levels below the current OSHA PEL of  $2 \text{ g}/\text{m}^3$ . CBD signs and symptoms can include shortness of breath, an unexplained cough, fatigue, weight loss, fever, and night sweats. Some workers with CBD may develop severe symptoms very quickly that become fatal, 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. CBD is a chronic obstructive lung disorder that may adversely affect quality of life and shorten life expectancy. Sarcoidosis, a granulomatous lung

## *Occupations with Potential Exposure to Beryllium (Be) include:*

- Be Metal/Alloy Production Workers
- Be Oxide/Ceramics Production Workers
- Foundry Workers
- Machinists and Machine Operators
- Metal Fabricators
- Welders
- Dental Technicians
- Abrasive blaster (slags)

disease of unknown cause or origin, has similar signs and symptoms with CBD that may make diagnosing CBD difficult without a record of occupational beryllium exposure.

**Beryllium sensitization** is the activation of the body's immune response to beryllium. Beryllium sensitization can result from inhalation or skin exposure to beryllium. Sensitization alone rarely results in noticeable symptoms. An individual must become sensitized to beryllium 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.

## Medical Screening and Surveillance

Workers with potential exposure to beryllium should participate in medical screening and surveillance as recommended by a medical professional with expertise in occupational exposure to beryllium and related health effects.

**Medical screening** — Medical screening should include a beryllium lymphocyte proliferation test (BeLPT) and may include biopsy by fiber optic bronchoscopy, X-ray, CT scan or positive blood or bronchoalveolar lavage BeLPT. BeLPT is a recognized blood test for measuring the immune response to beryllium in order to diagnose beryllium sensitization. Beryllium-specific lymphocyte proliferation in an individual's peripheral blood sample indicates an abnormal immune response and beryllium sensitization. Workers sensitized to beryllium are at risk for developing CBD and need continuing medical follow-up. CBD is diagnosed when medical screening identifies a beryllium exposure history and characteristics in the lung that indicate CBD.

**Medical surveillance** — is the systematic collection and analysis of health information on a group of workers. Medical surveillance programs provide for early identification and treatment for health effects and feedback to employers and employees that sensitization and/ or CBD has occurred. If sensitization and/or CBD are identified, the employer should evaluate workplace controls to reduce or eliminate the exposure.

## Treatment

There is no known cure for CBD. Treatment may include corticosteroids, oxygen, and other means to ease symptoms or slow the disease progression.

## Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

## How to Contact USF SafetyFlorida

For information or to request a free on-site consultation from USF SafetyFlorida Consultation Program, please visit us at [www.usfsafetyflorida.com](http://www.usfsafetyflorida.com) or call us toll-free at 1-866-273-1105.

Training courses in safety and health subjects are available from the USF OSHA Training Institute Education Center.

For more information, please visit [www.usfotcenter.org](http://www.usfotcenter.org) or call us at 813-994-1195.



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