

Beryllium Regulated Area Compliance Action Plan

Beryllium Regulated Area Compliance Action Plan

Congratulations, you have completed the Needs Assessment from the Guidance for Compliance website at www.berylliumsafety.com. This action plan is based on your answers to questions from the Guidance for Compliance website which indicates you need to establish a Beryllium Regulated Area. This action plan provides you with information and a work plan to address your compliance obligations under OSHA's Beryllium standard ([§ 1910.1024](#)).

This action plan has been prepared using information and data from sources considered to be technically reliable and is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and the subject products may be used and the actual conditions of use are beyond its control. The user is responsible for evaluating all available information when using the subject product for any particular use and complying with all federal, state, provincial and local laws, directives, statutes and regulations.

If you have questions or need additional assistance do not hesitate to contact Materion: Product Safety Hotline at 1-800-862-4118 (in the U.S.) or +1-216-383-4019 (outside the U.S.).

Here is what you should know:

(a) Scope and application

1. Your company is covered by OSHA's general industry standards.
2. You process beryllium containing products containing 0.1% beryllium or more by weight and those products do not meet the definition of an article under OSHA's Hazard Communication program, and
3. Your company does not have objective data demonstrating that employee exposure to beryllium will remain below the action level of 0.1 microgram of beryllium per cubic meter of air ($\mu\text{g}/\text{m}^3$), measured as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

(b) Definitions

Action level means a concentration of airborne beryllium of 0.1 microgram per cubic meter of air ($\mu\text{g}/\text{m}^3$) calculated as an 8-hour time-weighted average (TWA).

Airborne exposure and **airborne exposure to beryllium** mean the exposure to airborne beryllium that would occur if the employee were not using a respirator.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, United States Department of Labor, or designee.

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Beryllium lymphocyte proliferation test (BeLPT) means the measurement of blood lymphocyte proliferation in a laboratory test when lymphocytes are challenged with a soluble beryllium salt.

Beryllium sensitization means a response in the immune system of a specific individual who has been exposed to beryllium. There are no associated physical or clinical symptoms and no illness or disability with beryllium sensitization alone, but the response that occurs through beryllium sensitization can enable the immune system to recognize and react to beryllium. While not every beryllium-sensitized person will develop chronic beryllium disease (CBD), beryllium sensitization is essential for development of CBD.

Beryllium work area means any work area where materials that contain at least 0.1 percent beryllium by weight are processed either: (1) During any of the operations listed in [Appendix A](#) of this standard; or (2) Where employees are, or can reasonably be expected to be, exposed to airborne beryllium at or above the action level.

CBD diagnostic center means a medical diagnostic center that has a pulmonologist or pulmonary specialist on staff and on-site facilities to perform a clinical evaluation for the presence of chronic beryllium disease (CBD). The CBD diagnostic center must have the capacity to perform pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The CBD diagnostic center must also have the capacity to transfer BAL samples to a laboratory for appropriate diagnostic testing within 24 hours. The pulmonologist or pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

NOTE: This can be any pulmonary specialist knowledgeable in interpreting biopsy pathology and BAL diagnostic testing results.

Chronic beryllium disease (CBD) means a chronic granulomatous lung disease caused by inhalation of airborne beryllium by an individual who is beryllium sensitized.

Confirmed positive means the person tested has had two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results, obtained from tests conducted within a three-year period. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization.

Contaminated with beryllium and beryllium-contaminated means contaminated with dust, fumes, mists, or solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight.

Dermal contact with beryllium means skin exposure to: (1) Soluble beryllium compounds containing beryllium in concentrations greater than or equal to 0.1 percent by weight; (2) Solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight; or (3) Visible dust, fumes, or mists containing beryllium in concentrations greater than or equal to 0.1 percent by weight. The handling of beryllium

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materials in non-particulate solid form that are free from visible dust containing beryllium in concentrations greater than or equal to 0.1 percent by weight is not considered dermal contact under the standard.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which may or does result in an uncontrolled and unexpected release of beryllium that presents a significant hazard.

High-efficiency particulate air (HEPA) filter means a filter that is at least 99.97 percent efficient in removing particles 0.3 micrometers in diameter.

Objective data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating airborne exposure to beryllium associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher airborne exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations. *Note: Although the standard permits the use of objective data when performing an exposure assessment, it is prudent to collect air samples from jobs/tasks processing beryllium-containing materials in your shop environment, to verify the proper exposure judgements are being made.*

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows the individual to independently provide or be delegated the responsibility to provide some or all of the health care services required by paragraph [\(k\)](#) of this standard.

Regulated area means an area, including temporary work areas where maintenance or non-routine tasks are performed, where an employee's airborne exposure exceeds, or can reasonably be expected to exceed, either the time-weighted average (TWA) permissible exposure limit (PEL) or short term exposure limit (STEL).

This standard means this beryllium standard, 29 CFR 1910.1024.

(c) Permissible Exposure Limits

1. You must ensure that no employee is exposed to an airborne concentration of beryllium in excess of the Permissible Exposure Limit (PEL) $0.2 \mu\text{g}/\text{m}^3$ calculated as an 8-hour TWA.
2. You must ensure that no employee is exposed to an airborne concentration of beryllium in excess of the Short-term Exposure Limit (STEL) of $2.0 \mu\text{g}/\text{m}^3$ as determined over a sampling period of 15 minutes.

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(d) Exposure Assessment

1. You have assessed the airborne exposure of each employee who is or may reasonably be expected to be exposed to airborne beryllium in accordance with either the performance option or the scheduled monitoring option of the standard, and
2. Your exposure assessment has determined that worker exposures are **above** the PEL of $0.2 \mu\text{g}/\text{m}^3$ calculated as an 8-hour TWA or the STEL of $2.0 \mu\text{g}/\text{m}^3$ as determined over a sampling period of 15 minutes, therefore
3. You must develop and implement the compliance obligations for establishing a beryllium regulated area, and
4. You must reassess airborne exposure whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional airborne exposure at or above the action level or STEL, or when you have any reason to believe that new or additional airborne exposure at or above the action level or STEL has occurred.
5. You must notify each employee, within 15 working days after completing an exposure assessment, whose airborne exposure is represented by the results of that assessment individually in writing or post the results in an appropriate location that is accessible to each of these employees.

NOTE: [Resources](#) in the Guide for Compliance website contains a template for your consideration and use to meet the employee notification obligations listed above:

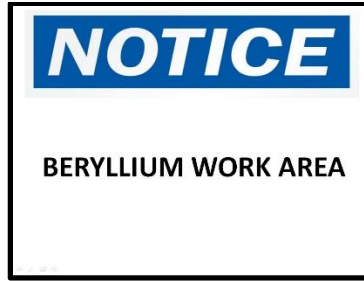
- Employee Notification of Monitoring Results Template

Here is what you need to do:

(e) Establish a Beryllium Work Area

1. You must establish and maintain a beryllium work area wherever the definition for a “beryllium work area” set forth in paragraph (b) is met.
2. You must establish and maintain a regulated area wherever employees are, or can reasonably be expected to be, exposed to airborne beryllium at levels above the TWA PEL or STEL.
3. You must identify each beryllium work area through signs or any other methods that adequately establish and inform each employee of the boundaries of each beryllium work area. Example beryllium work area sign:

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4. You must identify each regulated area in accordance with paragraph (m)(2) of this standard, as follows:



5. You must limit access to regulated areas to:
- i. Persons you authorize or require to be in a regulated area to perform work duties;
 - ii. Persons entering a regulated area as designated representatives of employees for the purpose of exercising the right to observe exposure monitoring procedures under paragraph (d) of the standard; and
 - iii. Persons authorized by law to be in a regulated area.
6. You must provide and ensure that each employee entering a regulated area uses:
- i. Respiratory protection in accordance with paragraph (g) of this standard; and
 - ii. Personal protective clothing and equipment in accordance with paragraph (h) of this standard.

(f) Methods of Compliance

I. Written Exposure Control Plan

- i. You must develop a written exposure controls plan (WECP). The plan must contain at a minimum:
 - A. A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium;
 - B. A list of operations and job titles reasonably expected to involve airborne exposure at or above the action level;

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- C. A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL;
- D. Procedures for minimizing cross-contamination, including the transfer of beryllium between surfaces, equipment, clothing, materials, and articles within beryllium work areas;
- E. Procedures for keeping surfaces as free as practicable of beryllium;
- F. Procedures for minimizing the migration of beryllium from beryllium work areas to other locations within or outside the workplace;
- G. A list of engineering controls, work practices, and respiratory protection required the standard;
- H. A list of personal protective clothing and equipment required by the standard; and
- I. Procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators.

NOTE: [Resources](#) in the Guide for Compliance website contains templates for your consideration and use to meet the WECP obligations listed above:

- Written Exposure Control Plan - Inventory Table Template
 - Written Exposure Control Plan Template
- ii. You must review and evaluate the effectiveness of your written exposure control plan at least annually and update it, as necessary, when:
 - A. Any change in production processes, materials, equipment, personnel, work practices, or control methods results, or can reasonably be expected to result, in new or additional airborne exposure to beryllium;
 - B. You are notified that an employee is eligible for medical removal in accordance with paragraph (l)(1) of this standard, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with exposure to beryllium; or
 - C. You have any reason to believe that new or additional airborne exposure is occurring or will occur.
 - iii. You must make a copy of the written exposure control plan accessible to each employee who is, or can reasonably be expected to be, exposed to airborne beryllium in accordance with OSHA's Access to Employee Exposure and Medical Records (Records Access) standard ([§ 1910.1020\(e\)](#)).
2. Engineering and Work Practice Controls
- i. You must use engineering and work practice controls to reduce and maintain employee airborne exposure to beryllium to or below the PEL and STEL, unless you can demonstrate that such controls are not feasible. Wherever you demonstrate that it is not feasible to reduce airborne exposure to or below the PELs with engineering and work practice controls, you must implement and maintain engineering and work practice controls to reduce airborne exposure to

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the lowest levels feasible and supplement these controls by using respiratory protection in accordance with paragraph (g) of this standard.

- ii. For each operation in a beryllium work area that releases airborne beryllium, you must ensure that at least one of the following is in place to reduce airborne exposure:
 - A. Material and/or process substitution;
 - B. Isolation, such as ventilated partial or full enclosures;
 - C. Local exhaust ventilation, such as at the points of operation, material handling, and transfer; or
 - D. Process control, such as wet methods and automation.
 - iii. You are exempt from using the controls listed above to the extent that:
 - A. You can establish that such controls are not feasible; or
 - B. You can demonstrate that airborne exposure is below the action level, using no fewer than two representative personal breathing zone samples taken at least 7 days apart, for each affected operation.
3. You must not rotate employees to different jobs to achieve compliance with the PELs.

(g) Respiratory Protection

1. You must provide respiratory protection at no cost to the employee and ensure that each employee uses respiratory protection:
 - i. During periods necessary to install or implement feasible engineering and work practice controls where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;
 - ii. During operations, including maintenance and repair activities and non-routine tasks, when engineering and work practice controls are not feasible and airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;
 - iii. During operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL;
 - iv. During emergencies, and
 - v. When an employee who is eligible for medical removal under paragraph [\(l\)\(1\)](#) chooses to remain in a job with airborne exposure at or above the action level, as permitted by paragraph [\(l\)\(2\)\(ii\)](#) of this standard.
2. Where this standard requires an employer to provide respiratory protection, the selection and use of such respiratory protection must be in accordance with the Respiratory Protection standard [\(§ 1910.134\)](#).

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3. You must provide at no cost to the employee a powered air-purifying respirator (PAPR) instead of a negative pressure respirator when;
 - i. Respiratory protection is required by this standard;
 - ii. An employee entitled to such respiratory protection requests a PAPR; and
 - iii. The PAPR provides adequate protection to the employee in accordance with paragraph [\(g\)\(2\)](#) of this standard.

(h) Personal Protective Clothing and Equipment

1. *Provision and use* - You must provide at no cost, and ensure that each employee uses, appropriate personal protective clothing and equipment in accordance with the written exposure control plan required under paragraph [\(f\)\(1\)](#) of this standard and OSHA's Personal Protective Equipment standards [\(subpart I of this part\)](#):
 - i. Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; or
 - ii. Where there is a reasonable expectation of dermal contact with beryllium.
2. *Removal and storage*
 - i. You must ensure that each employee removes all beryllium-contaminated personal protective clothing and equipment at the end of the work shift, at the completion of all tasks involving beryllium, or when personal protective clothing or equipment becomes visibly contaminated with beryllium, whichever comes first.
 - ii. You must ensure that each employee removes beryllium-contaminated personal protective clothing and equipment as specified in the written exposure control plan.
 - iii. You must ensure that each employee stores and keeps beryllium-contaminated personal protective clothing and equipment separate from street clothing and that storage facilities prevent cross-contamination as specified in the written exposure control plan.
 - iv. You must ensure that no employee removes beryllium-contaminated personal protective clothing or equipment from the workplace, except for employees authorized to do so for the purposes of laundering, cleaning, maintaining or disposing of beryllium-contaminated personal protective clothing and equipment at an appropriate location or facility away from the workplace.
 - v. When personal protective clothing or equipment required by the standard is removed from the workplace for laundering, cleaning, maintenance or disposal, you must ensure that personal protective clothing and equipment are stored and transported in sealed bags or other closed containers that are impermeable and are labeled in accordance requirements of the standard.

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3. *Cleaning and replacement*

- i. You must ensure that all reusable personal protective clothing and equipment required by the standard is cleaned, laundered, repaired, and replaced as needed to maintain its effectiveness.
- ii. You must ensure that beryllium is not removed from beryllium-contaminated personal protective clothing and equipment by blowing, shaking or any other means that disperses beryllium into the air.
- iii. You must inform in writing the persons or the business entities who launder, clean or repair the personal protective clothing or equipment required by this standard of the potentially harmful effects of exposure to beryllium and that the personal protective clothing and equipment must be handled in accordance with this standard.

(i) **Hygiene Areas and Practices**

1. For each employee working in a beryllium work area or who can reasonably be expected to have dermal contact with beryllium, you must:
 - i. Provide readily accessible washing facilities in accordance with the standard to remove beryllium from the hands, face, and neck; and
 - ii. Ensure that employees who have dermal contact with beryllium wash any exposed skin at the end of the activity, process, or work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.
2. *Change rooms.* In addition to the above requirements , you must provide employees who are required to use personal protective clothing or equipment when there is a reasonable expectation of dermal contact with beryllium with a designated change room in accordance with this standard and the Sanitation standard ([§ 1910.141](#)) where employees are required to remove their personal clothing.
3. You must provide showers where:
 - a. Airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; and
 - b. Beryllium can reasonably be expected to contaminate employees' hair or body parts other than hands, face, and neck.
4. When required to provide showers, you must ensure that each employee showers at the end of the work shift or work activity if:
 - a. The employee reasonably could have had airborne exposure above the TWA PEL or STEL; and
 - b. Beryllium could reasonably have contaminated the employee's hair or body parts other than hands, face, and neck.

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5. *Eating and drinking areas* - Wherever employees are permitted to consume food or beverages at a worksite where beryllium is present, you must ensure that:
 - a. Surfaces in eating and drinking areas are as free as practicable of beryllium;
 - b. No employees enter any eating or drinking area with beryllium-contaminated personal protective clothing or equipment unless, prior to entry, it is cleaned, as necessary, to be as free as practicable of beryllium by methods that do not disperse beryllium into the air or onto an employee's body; and
 - c. Eating and drinking facilities are in accordance with the Sanitation standard ([§ 1910.141](#)).
6. *Prohibited activities* - You must ensure that no employees eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

(j) Housekeeping

1. You must maintain all surfaces in beryllium work areas as free as practicable of beryllium and in accordance with the written exposure control plan required under the standard; and
2. You must ensure that all spills and emergency releases of beryllium are cleaned up promptly and in accordance with the written exposure control plan required under the standard.
3. You must ensure that surfaces in beryllium work areas are cleaned by HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure.
4. You must not allow dry sweeping or brushing for cleaning surfaces in beryllium work areas unless HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure are not safe or effective.
5. You must not allow the use of compressed air for cleaning beryllium-contaminated surfaces unless the compressed air is used in conjunction with a ventilation system designed to capture the particulates made airborne by the use of compressed air.
6. Where employees use dry sweeping, brushing, or compressed air to clean beryllium-contaminated surfaces, you must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with the requirements of the standard.
7. You must ensure that cleaning equipment is handled and maintained in a manner that minimizes the likelihood and level of airborne exposure and the re-entrainment of airborne beryllium in the workplace.
8. *Disposal, recycling, and reuse.* You must ensure that:

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- i. Except for intra-plant transfers, when you transfer materials that contain at least 0.1 percent beryllium by weight or are contaminated with beryllium for disposal, recycling, or reuse, you must label the materials as follows:



- ii. Except for intra-plant transfers, materials designated for disposal that contain at least 0.1 percent beryllium by weight or are contaminated with beryllium must be cleaned to be as free as practicable of beryllium or placed in enclosures that prevent the release of beryllium-containing particulate or solutions under normal conditions of use, storage, or transport, such as bags or containers; and
- iii. Except for intra-plant transfers, materials designated for recycling or reuse that contain at least 0.1 percent beryllium by weight or are contaminated with beryllium must be cleaned to be as free as practicable of beryllium or placed in enclosures that prevent the release of beryllium-containing particulate or solutions under normal conditions of use, storage, or transport, such as bags or containers.

(k) Medical Surveillance

1. General

- i. You must make medical surveillance required by this paragraph available at no cost to the employee, and at a reasonable time and place, to each employee:
 - A. Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;
 - B. Who shows signs or symptoms of CBD or other beryllium-related health effects;
 - C. Who is exposed to beryllium during an emergency; or
 - D. Whose most recent written medical opinion required by paragraph (k)(6) or (k)(7) of this standard recommends periodic medical surveillance.
 - ii. You must ensure that all medical examinations and procedures required by this standard are performed by, or under the direction of, a licensed physician.
2. Frequency - You shall provide a medical examination:
 - i. Within 30 days after determining that:
 - A. An employee meets the criteria of paragraph (k)(1)(i)(A), unless the employee has received a medical examination, provided in accordance with this standard, within the last two years; or
 - B. An employee meets the criteria of paragraph (k)(1)(i)(B) of this standard.

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- ii. At least every two years thereafter for each employee who continues to meet the criteria of paragraph (k)(1)(i)(A), (B), or (D) of this standard.
- iii. At the termination of employment for each employee who meets any of the criteria of paragraph (k)(1)(i) of this standard at the time the employee's employment terminates, unless an examination has been provided in accordance with this standard during the six months prior to the date of termination. Each employee who meets the criteria of paragraph (k)(1)(i)(C) of this standard and who has not received an examination since exposure to beryllium during the emergency must be provided an examination at the time the employee's employment terminates.
- iv. For an employee who meets the criteria of paragraph (k)(1)(i)(C) of this standard:
 - A. If that employee has not received a medical examination within the previous two years pursuant to paragraph (k)(1)(i) of this standard, then within 30 days after the employee meets the criteria of paragraph (k)(1)(i)(C) of this standard; or
 - B. If that employee has received a medical examination within the previous two years pursuant to paragraph (k)(1)(i) of this standard, then at least one year but no more than two years after the employee meets the criteria of paragraph (k)(1)(i)(C) of this standard.

3. Contents of examination

- i. You must ensure that the PLHCP conducting the examination advises the employee of the risks and benefits of participating in the medical surveillance program and the employee's right to opt out of any or all parts of the medical examination.
- ii. You must ensure that the employee is offered a medical examination that includes:
 - A. A medical and work history, with emphasis on past and present airborne exposure to or dermal contact with beryllium, smoking history, and any history of respiratory system dysfunction;
 - B. A physical examination with emphasis on the respiratory system;
 - C. A physical examination for skin rashes;
 - D. Pulmonary function tests, performed in accordance with the guidelines established by the American Thoracic Society including forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁);
 - E. A standardized BeLPT or equivalent test, upon the first examination and at least every two years thereafter, unless the employee is confirmed positive. If the results of the BeLPT are other than normal, a follow-up BeLPT must be offered within 30 days, unless the employee has been confirmed positive. Samples must be analyzed in a laboratory certified under the College of American Pathologists/Clinical Laboratory Improvement Amendments (CLIA) guidelines to perform the BeLPT.
 - F. A low dose computed tomography (LDCT) scan, when recommended by the PLHCP after considering the employee's history of exposure to

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- beryllium along with other risk factors, such as smoking history, family medical history, sex, age, and presence of existing lung disease; and
- G. Any other test deemed appropriate by the PLHCP.

4. *Information provided to the PLHCP* - You must ensure that the examining PLHCP (and the agreed-upon CBD diagnostic center, if an evaluation is required under paragraph (k)(7) of this standard) has a copy of this standard and must provide the following information, if known:
- i. A description of the employee's former and current duties that relate to the employee's airborne exposure to and dermal contact with beryllium;
 - ii. The employee's former and current levels of airborne exposure;
 - iii. A description of any personal protective clothing and equipment, including respirators, used by the employee, including when and for how long the employee has used that personal protective clothing and equipment; and
 - iv. Information from records of employment-related medical examinations previously provided to the employee, currently within your control, after obtaining written consent from the employee.
5. *Licensed physician's written medical opinion* - You must ensure that the employee receives a written medical report from the licensed physician within 45 days of the examination (including any follow-up BeLPT required under paragraph (k)(3)(ii)(E) of this standard) and that the PLHCP explains the results of the examination to the employee. The written medical report must contain:
- i. A statement indicating the results of the medical examination, including the licensed physician's opinion as to whether the employee has
 - A. Any detected medical condition, such as CBD or beryllium sensitization (i.e., the employee is confirmed positive, as defined in paragraph (b) of this standard), that may place the employee at increased risk from further airborne exposure, and
 - B. Any medical conditions related to airborne exposure that require further evaluation or treatment.
 - ii. Any recommendations on:
 - A. The employee's use of respirators, protective clothing, or equipment; or
 - B. Limitations on the employee's airborne exposure to beryllium.
 - iii. If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, the written report must also contain a referral for an evaluation at a CBD diagnostic center.
 - iv. If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for continued periodic medical surveillance.
 - v. If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph (l) of this standard.
6. *Licensed physician's written medical opinion for the employer*
- i. You must obtain a written medical opinion from the licensed physician within 45 days of the medical examination (including any follow-up BeLPT required under

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paragraph [\(k\)\(3\)\(ii\)\(E\)](#) of this standard). The written medical opinion must contain only the following:

- A. The date of the examination;
 - B. A statement that the examination has met the requirements of this standard;
 - C. Any recommended limitations on the employee's use of respirators, protective clothing, or equipment; and
 - D. A statement that the PLHCP has explained the results of the medical examination to the employee, including any tests conducted, any medical conditions related to airborne exposure that require further evaluation or treatment, and any special provisions for use of personal protective clothing or equipment;
- ii. If the employee provides written authorization, the written opinion must also contain any recommended limitations on the employee's airborne exposure to beryllium.
 - iii. If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, and the employee provides written authorization, the written opinion must also contain a referral for an evaluation at a CBD diagnostic center.
 - iv. If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for continued periodic medical surveillance.
 - v. If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph [\(l\)](#) of this standard.
 - vi. You must ensure that each employee receives a copy of the written medical opinion described in paragraph [\(k\)\(6\)](#) of this standard within 45 days of any medical examination (including any follow-up BeLPT required under paragraph [\(k\)\(3\)\(ii\)\(E\)](#) of this standard) performed for that employee.

7. CBD diagnostic center

- i. You must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by you and the employee. The evaluation at the CBD diagnostic center must be scheduled within 30 days, and must occur within a reasonable time, of:
 - A. Your receipt of a physician's written medical opinion that recommends referral to a CBD diagnostic center; or
 - B. The employee presenting to you a physician's written medical report indicating that the employee has been confirmed positive or diagnosed with CBD, or recommending referral to a CBD diagnostic center.
- ii. You must ensure that, as part of the evaluation, the employee is offered any tests deemed appropriate by the examining physician at the CBD diagnostic center, such as pulmonary function testing (as outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. If any of the tests deemed appropriate by the examining physician are not available at

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- the CBD diagnostic center, they may be performed at another location that is mutually agreed upon by you and the employee.
- iii. You must ensure that the employee receives a written medical report from the CBD diagnostic center that contains all the information required in paragraph (k)(5)(i), (ii), (iv), and (v) of this standard and that the PLHCP explains the results of the examination to the employee within 30 days of the examination.
 - iv. You must obtain a written medical opinion from the CBD diagnostic center within 30 days of the medical examination. The written medical opinion must contain only the information in paragraph (k)(6)(i), as applicable, unless the employee provides written authorization to release additional information. If the employee provides written authorization, the written opinion must also contain the information from paragraphs (k)(6)(ii), (iv), and (v), if applicable.
 - v. You must ensure that each employee receives a copy of the written medical opinion from the CBD diagnostic center described in paragraph (k)(7) of this standard within 30 days of any medical examination performed for that employee.
 - vi. After an employee has received the initial clinical evaluation at a CBD diagnostic center described in paragraphs (k)(7)(i) and (ii) of this standard, the employee may choose to have any subsequent medical examinations for which the employee is eligible under paragraph (k) of this standard performed at a CBD diagnostic center mutually agreed upon by you and the employee, and you must provide such examinations at no cost to the employee.

(l) Medical Removal

1. An employee is eligible for medical removal, if the employee works in a job with airborne exposure at or above the action level and either:
 - i. The employee provides you with:
 - A. A written medical report indicating a confirmed positive finding or CBD diagnosis; or
 - B. A written medical report recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(5)(v) or (k)(7)(ii) of the standard; or
 - ii. You receive a written medical opinion recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(6)(v) or (k)(7)(iii) of the standard.
2. If an employee is eligible for medical removal, you must provide the employee with the employee's choice of:
 - i. Removal as described in paragraph (l)(3) of the standard; or
 - ii. Remaining in a job with airborne exposure at or above the action level, provided that you provide, and ensure that the employee uses, respiratory protection that complies with paragraph (g) of the standard whenever airborne exposures are at or above the action level.
3. If the employee chooses removal:

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- i. If a comparable job is available where airborne exposures to beryllium are below the action level, and the employee is qualified for that job or can be trained within one month, you must remove the employee to that job. you must maintain for six months from the time of removal the employee's base earnings, seniority, and other rights and benefits that existed at the time of removal.
 - ii. If comparable work is not available, you must maintain the employee's base earnings, seniority, and other rights and benefits that existed at the time of removal for six months or until such time that comparable work described in paragraph [\(l\)\(3\)\(i\)](#) becomes available, whichever comes first.
4. Your obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal from a publicly or employer-funded compensation program, or receives income from another employer made possible by virtue of the employee's removal.

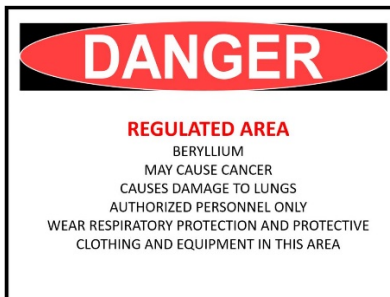
(m) Communication of Hazards

1. General

- i. You must comply with all requirements of the HCS ([§ 1910.1200](#)) for beryllium.
- ii. In classifying the hazards of beryllium, at least the following hazards must be addressed: cancer; lung effects (CBD and acute beryllium disease); beryllium sensitization; skin sensitization; and skin, eye, and respiratory tract irritation.
- iii. You must include beryllium in the hazard communication program established to comply with the HCS. Employers must ensure that each employee has access to labels on containers of beryllium and to safety data sheets, and is trained in accordance with the requirements of the HCS ([§ 1910.1200](#)) and paragraph [\(m\)\(4\)](#).

2. Warning signs

- i. *Posting.* You must provide and display warning signs at each approach to a regulated area so that each employee is able to read and understand the signs and take necessary protective steps before entering the area.
- ii. *Sign specification.*
 - A. You must ensure that the warning signs are legible and readily visible.
 - B. You must ensure each warning signs bear the following legend:



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3. *Warning labels.* Consistent with the HCS ([§ 1910.1200](#)), you must label each immediate container of clothing, equipment, and materials contaminated with beryllium, and must, at a minimum, include the following on the label:



4. *Employee information*
- i. For each employee who has, or can reasonably be expected to have, airborne exposure to or dermal contact with beryllium, you must:
 - A. Provide information and training in accordance with the HCS ([§ 1910.1200\(h\)](#));
 - B. Provide initial training to each employee by the time of initial assignment; and
 - C. Repeat the training required under this section annually for each employee.
 - ii. You must ensure that each employee who is, or can reasonably be expected to be, exposed to airborne beryllium can demonstrate knowledge and understanding of the following:
 - A. The health hazards associated with airborne exposure to and dermal contact with beryllium, including the signs and symptoms of CBD;
 - B. The written exposure control plan, with emphasis on the location(s) of beryllium work areas and the specific nature of operations that could result in airborne exposure;
 - C. The purpose, proper selection, fitting, proper use, and limitations of personal protective clothing and equipment, including respirators;
 - D. Applicable emergency procedures;
 - E. Measures employees can take to protect themselves from airborne exposure to and dermal contact with beryllium, including personal hygiene practices;
 - F. The purpose and a description of the medical surveillance program required by paragraph [\(k\)](#) of the standard including risks and benefits of each test to be offered;
 - G. The purpose and a description of the medical removal protection provided under paragraph [\(l\)](#) of this section;
 - H. The contents of the standard; and
 - I. The employee's right of access to records under the Records Access standard ([§ 1910.1020](#)).

NOTE: [Resources](#) in the Guide for Compliance website contains a template for your consideration and use to meet the employee training obligations listed above:

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- OSHA Training for Beryllium Workers
- iii. When a workplace change (such as modification of equipment, tasks, or procedures) results in new or increased airborne exposure that exceeds, or can reasonably be expected to exceed, either the TWA PEL or the STEL, you must provide additional training to those employees affected by the change in airborne exposure.
- iv. You must make a copy of the standard and its appendices readily available at no cost to each employee and designated employee representative(s).

(n) Recordkeeping

I. Air monitoring data

- i. You must make and maintain a record of all exposure measurements taken to assess airborne exposure as prescribed in paragraph (d) of the standard.
- ii. This record must include at least the following information:
 - A. The date of measurement for each sample taken;
 - B. The task that is being monitored;
 - C. The sampling and analytical methods used and evidence of their accuracy;
 - D. The number, duration, and results of samples taken;
 - E. The type of personal protective clothing and equipment, including respirators, worn by monitored employees at the time of monitoring; and
 - F. The name and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.
- iii. You must ensure that exposure records are maintained and made available in accordance with the Records Access standard ([§ 1910.1020](#)).

NOTE: [Resources](#) in the Guide for Compliance website contains a template for your consideration and use to meet the air monitoring data recordkeeping obligations listed above:

- Recordkeeping – Exposure Measurements Template

2. Objective data

- i. Where an employer uses objective data to satisfy the exposure assessment requirements under paragraph (d) of the standard, you must make and maintain a record of the objective data relied upon.
- ii. This record must include at least the following information:
 - A. The data relied upon;
 - B. The beryllium-containing material in question;
 - C. The source of the objective data;
 - D. A description of the process, task, or activity on which the objective data were based; and
 - E. Other data relevant to the process, task, activity, material, or airborne exposure on which the objective data were based.
- iii. You must ensure that objective data are maintained and made available in accordance with the Records Access standard ([§ 1910.1020](#)).

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3. Medical surveillance
 - i. You must make and maintain a record for each employee covered by medical surveillance under paragraph [\(k\)](#) of the standard.
 - ii. The record must include the following information about each employee:
 - A. Name and job classification;
 - B. A copy of all licensed physicians' written medical opinions for each employee; and
 - C. A copy of the information provided to the PLHCP as required by paragraph [\(k\)\(4\)](#) of the standard.
 - iii. You must ensure that medical records are maintained and made available in accordance with the Records Access standard ([§ 1910.1020](#)).
4. Training
 - i. At the completion of any training required by the standard, you must prepare a record that indicates the name and job classification of each employee trained, the date the training was completed, and the topic of the training.
 - ii. This record must be maintained for three years after the completion of training.
5. Access to records - Upon request, you must make all records maintained as a requirement of the standard available for examination and copying to the Assistant Secretary, the Director, each employee, and each employee's designated representative(s) in accordance the Records Access standard ([§ 1910.1020](#)).
6. Transfer of records - You must comply with the requirements involving transfer of records set forth in the Records Access standard ([§ 1910.1020](#)).

(o) Dates

1. Effective dates - All obligations of the standard are enforceable as of September 14, 2020.

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1. *Appendix A to § 1910.1024 - Operations for Establishing Beryllium Work Areas*

Paragraph (b) of this standard defines a beryllium work area as any work area where materials that contain at least 0.1 percent beryllium by weight are processed (1) during any of the operations listed in Appendix A of this Standard, or (2) where employees are, or can reasonably be expected to be, exposed to airborne beryllium at or above the action level. Table A.1 in this appendix sets forth the operations that, where performed under the circumstances described in the column heading above the particular operations, trigger the requirement for a beryllium work area.

Table A.1: Operations for Establishing Beryllium Work Areas Where Processing Materials Containing at Least 0.1 Percent Beryllium by Weight

| Beryllium Metal Alloy Operations (generally < 10 % beryllium by weight) | Beryllium Composite Operations (generally > 10% beryllium by weight) and Beryllium Metal Operations | Beryllium Oxide Operations |
|---|---|-----------------------------------|
| Abrasive Blasting | Abrasive Blasting | Abrasive Blasting |
| Abrasive Processing | Abrasive Processing | Abrasive Processing |
| Abrasive Sawing | Abrasive Sawing | Abrasive Sawing |
| Annealing | Annealing | Boring |
| Bright Cleaning | Atomizing | Brazing (> 1,100° C) |
| Brushing | Attritioning | Broaching with green ceramic |
| Buffing | Blanking | Brushing |
| Burnishing | Bonding | Buffing |
| Casting | Boring | Centerless grinding |
| Centerless Grinding | Breaking | Chemical Cleaning |
| Chemical Cleaning | Bright Cleaning | Chemical Etching |
| Chemical Etching | Broaching | CNC Machining |
| Chemical Milling | Brushing | Cold Isostatic Pressing (CIP) |
| Dross Handling | Buffing | Crushing |
| Deburring (grinding) | Burnishing | Cutting |
| Electrical Chemical Machining (ECM) | Casting | Deburring (grinding) |
| Electrical Discharge Machining (EDM) | Centerless Grinding | Deburring (non-grinding) |
| | Chemical Cleaning | Destructive Testing |
| | Chemical Etching | Dicing |

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| Beryllium Metal Alloy Operations (generally < 10 % beryllium by weight) | Beryllium Composite Operations (generally > 10% beryllium by weight) and Beryllium Metal Operations | Beryllium Oxide Operations |
|---|---|---|
| Extrusion | Chemical Milling | Drilling |
| Forging | CNC Machining | Dry/wet Tumbling |
| Grinding | Cold Isostatic Pressing | Extrusion |
| Heat Treating (in air) | Cold Pilger | Filing by Hand |
| High Speed Machining (>10,000 rpm) | Crushing | Firing of green ceramic |
| Hot Rolling | Cutting | Firing of refractory metallization (> 1,100° C) |
| Lapping | Deburring | Grinding |
| Laser Cutting | Dicing | Honing |
| Laser Machining | Drawing | Hot Isostatic Pressing (HIP) |
| Laser Scribing | Drilling | Lapping |
| Laser Marking | Dross Handling | Laser Cutting |
| Melting | Electrical Chemical Machining (ECM) | Laser Machining |
| Photo-Etching | Electrical Discharge Machining (EDM) | Laser Scribing |
| Pickling | Extrusion | Laser Marking |
| Point and Chamfer | Filing by Hand | Machining |
| Polishing | Forging | Milling |
| Torch Cutting (i.e., oxy-acetylene) | Grinding | Piercing |
| Tumbling | Heading | Mixing |
| Water-jet Cutting | Heat Treating | Plasma Spray |
| Welding | Honing | Polishing |
| Sanding | Hot Isostatic Pressing (HIP) | Powder Handling |
| Slab Milling | Lapping | Powder Pressing |
| | Laser Cutting | Reaming |
| | Laser Machining | Sanding |
| | Laser Scribing | Sectioning |
| | Laser Marking | Shearing |
| | | Sintering of green ceramic |

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| Beryllium Metal Alloy Operations (generally < 10 % beryllium by weight) | Beryllium Composite Operations (generally > 10% beryllium by weight) and Beryllium Metal Operations | Beryllium Oxide Operations |
|---|---|---|
| | Machining Melting Milling Mixing Photo-Etching Pickling Piercing Pilger Plasma Spray Point and Chamfer Polishing Powder Handling Powder Pressing Pressing Reaming Roll Bonding Rolling Sanding Sawing (tooth blade) Shearing Sizing Skiving Slitting Snapping Sputtering Stamping Spray Drying Tapping | Sintering of refractory metallization (>1,100° C) Snapping Spray Drying Tape casting Turning Water jet cutting |

Beryllium Regulated Area Compliance Action Plan

| Beryllium Metal Alloy Operations (generally < 10 % beryllium by weight) | Beryllium Composite Operations (generally > 10% beryllium by weight) and Beryllium Metal Operations | Beryllium Oxide Operations |
|---|---|-----------------------------------|
| | Tensile Testing Torch Cutting (i.e., oxy acetylene) Trepanning Tumbling Turning Vapor Deposition Water-jet Cutting Welding | |