

WAC 296-62-085, Beryllium

WAC 296-85803, Scope.

- (1) This standard applies to occupational exposure to beryllium in all forms, compounds, and mixtures, except.
- (2) This standard does not apply to articles, as defined in the Hazard Communication standard (HCS) (§ 1910.1200(c)), that contain beryllium and that the employer does not process.
- (3) This standard does not apply to materials containing less than 0.1% beryllium by weight where the employer has objective data demonstrating that employee exposure to beryllium will remain below the action level as an 8-hour TWA under any foreseeable conditions.

WAC 296-62-08505 Definitions. For the purposes of this section the following definitions apply:

Action level - A concentration of airborne beryllium of 0.1 micrograms 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** - The exposure to airborne beryllium that would occur if the employee were not using a respirator.

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

Beryllium work area - Any work area containing a process or operation that can release beryllium where employees are, or can reasonably be expected to be, exposed to airborne beryllium at any level or where there is the potential for dermal contact with beryllium.

CBD diagnostic center - A medical diagnostic center that has an on-site pulmonary specialist and on-site facilities to perform a clinical evaluation for the presence of chronic beryllium disease (CBD). This evaluation must include 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 on-site pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

Chronic beryllium disease (CBD) - A chronic lung disease associated with airborne exposure to beryllium.

Competent person - An individual who is capable of identifying existing and foreseeable beryllium hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge, ability, and authority necessary to fulfill the responsibilities set forth in paragraph (e) . This term is applicable in construction activities conducted under contract with a building or facility owner or other building representative.

Confirmed positive - The person tested has beryllium sensitization, as indicated by two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization.

Emergency - Any uncontrolled release of airborne beryllium.
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 - 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.

Physician or other licensed health care professional (PLHCP) - 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 WAC 296-62-08523 .

Regulated area - 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).

WAC 296-62-08507 Permissible Exposure Limits.

- (1) **Time-weighted average (TWA) PEL.** The employer must ensure that no employee is exposed to an airborne concentration of beryllium in excess of 0.2 $\mu\text{g}/\text{m}^3$ calculated as an 8-hour TWA.

- (2) **Short-term exposure limit (STEL).** The employer must ensure that no employee is exposed to an airborne concentration of beryllium in excess of $2.0 \mu\text{g}/\text{m}^3$ as determined over a sampling period of 15 minutes.

WAC 296-62-08509 Exposure assessment.

- (1) **General.** The employer must assess 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 in subsection (2) or the scheduled monitoring option in subsection (3) of this section.
- (2) **Performance option.** The employer must assess the 8-hour TWA exposure and the 15 minute short-term exposure for each employee on the basis of any combination of air monitoring data and objective data sufficient to accurately characterize airborne exposure to beryllium.
- (3) **Scheduled monitoring option.**
 - (a) The employer must perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the airborne exposure of employees on each shift, for each job classification, and in each work area.
 - (b) The employer must perform initial monitoring to assess the short-term exposure from 15-minute personal breathing zone air samples measured in operations that are likely to produce airborne exposure above the STEL for each work shift, for each job classification, and in each work area.
 - (c) Where several employees perform the same tasks on the same shift and in the same work area, the employer may sample a representative fraction of these employees in order to meet the requirements of this subsection. In representative sampling, the employer must sample the employee(s) expected to have the highest airborne exposure to beryllium.
 - (d) If initial monitoring indicates that airborne exposure is below the action level and at or below the STEL, the employer may discontinue monitoring for those employees whose airborne exposure is represented by such monitoring.
 - (e) Where the most recent exposure monitoring indicates that airborne exposure is at or above the action level but at or below the TWA PEL, the employer must repeat such monitoring within six months of the most recent monitoring.

- (f) Where the most recent exposure monitoring indicates that airborne exposure is above the TWA PEL, the employer must repeat such monitoring within three months of the most recent 8-hour TWA exposure monitoring.
 - (g) Where the most recent (non-initial) exposure monitoring indicates that airborne exposure is below the action level, the employer must repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken 7 or more days apart, are below the action level, at which time the employer may discontinue 8-hour TWA exposure monitoring for those employees whose exposure is represented by such monitoring, except as otherwise provided in subsection (4), Reassessment of exposure.
 - (h) Where the most recent exposure monitoring indicates that airborne exposure is above the STEL, the employer must repeat such monitoring within three months of the most recent short-term exposure monitoring until two consecutive measurements, taken 7 or more days apart, are below the STEL, at which time the employer may discontinue short-term exposure monitoring for those employees whose exposure is represented by such monitoring, except as otherwise provided in subsection (4), Reassessment of exposure.
- (4) **Reassessment of exposure.** The employer 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 the employer has any reason to believe that new or additional airborne exposure at or above the action level or STEL has occurred.
- (5) **Methods of sample analysis.** The employer must ensure that all air monitoring samples used to satisfy the monitoring requirements of this subsection are evaluated by a laboratory that can measure beryllium to an accuracy of plus or minus 25 percent within a statistical confidence level of 95 percent for airborne concentrations at or above the action level.
- (6) **Employee notification of assessment results.**
- (a) Within 15 working days after completing an exposure assessment in accordance with this subsection, the employer must notify each employee whose airborne exposure is represented by the assessment of the results of that assessment individually in writing or post the results in an appropriate location that is accessible to each of these employees.
 - (b) Whenever an exposure assessment indicates that airborne exposure is above the TWA PEL or STEL, the employer must describe in the written notification the corrective action being taken to reduce airborne exposure to or below the exposure limit(s)

exceeded where feasible corrective action exists but had not been implemented when the monitoring was conducted.

(7) Observation of monitoring.

- (a) The employer must provide an opportunity to observe any exposure monitoring required by this standard to each employee whose airborne exposure is measured or represented by the monitoring and each employee's representative(s).
- (b) When observation of monitoring requires entry into an area where the use of personal protective clothing or equipment (which may include respirators) is required, the employer must provide each observer with appropriate personal protective clothing and equipment at no cost to the observer and must ensure that each observer uses such clothing and equipment.
- (c) The employer must ensure that each observer follows all other applicable safety and health procedures.

WAC 296-62-08511 Beryllium work areas and regulated areas.

(1) Establishment.

- (a) The employer must establish and maintain a beryllium work area wherever the criteria for a "beryllium work area" set forth in subsection WAC 296-62-08505, Definitions, are met.
Exception: It is not necessary to establish a beryllium work area for temporary activities when all employees in the area and adjacent to the area are informed of the beryllium work during safety meetings prior to the work and at least weekly while the work continues.
- (b) The employer 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.
Exception: A regulated area is not required for activities in an otherwise well regulated, high hazard worksite. The worksite must be inspected by an employer representative with knowledge and authority to identify and correct issues (a competent person, in construction activities) at least weekly and covered in weekly safety meetings with all workers in or adjacent to the area of work.

(2) **Demarcation.**

- (a) The employer 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.
- (b) The employer must identify each regulated area in accordance with subsection WAC 296-62-08525(2), Warning signs, of this rule.

(3) **Access.** The employer must limit access to regulated areas to:

- (a) Persons the employer authorizes or requires to be in a regulated area to perform work duties;
- (b) Persons entering a regulated area as designated representatives of employees for the purpose of exercising the right to observe exposure monitoring procedures under subsection WAC 296-62-08509(7), Observation of monitoring, ; and
- (c) Persons authorized by law to be in a regulated area.

(4) **Provision of personal protective clothing and equipment, including respirators.** The employer must provide and ensure that each employee entering a regulated area uses:

- (a) Respiratory protection in accordance with section WAC 296-62-08515, Respiratory protection, of this rule; and
- (b) Personal protective clothing and equipment in accordance with section WAC 296-62-08517, Personal protective clothing and equipment, of this rule.

WAC 296-62-08512 Competent Person. For construction and maintenance projects, wherever employees are, or can reasonably be expected to be, exposed to airborne beryllium at levels above the TWA PEL or STEL, the employer must designate a competent person to:

- (1) Make frequent and regular inspections of job sites, materials, and equipment;
- (2) Implement the written exposure control plan under section WAC 296-62-08513, Methods of compliance, of this rule;
- (3) Ensure that all employees use respiratory protection in accordance with section WAC 296-62-08515, Respiratory protection, of this rule; and

- (4) Ensure that all employees use personal protective clothing and equipment in accordance with section WAC 296-62-08517, Personal protective clothing and equipment, of this rule.

WAC 296-62-08513 Methods of compliance.

(1) Written exposure control plan.

- (a) The employer must establish, implement, and maintain a written exposure control plan, which must contain:
 - (i) A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium;
 - (ii) A list of operations and job titles reasonably expected to involve airborne exposure at or above the action level;
 - (iii) A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL;
 - (iv) Procedures for minimizing cross-contamination, including preventing the transfer of beryllium between surfaces, equipment, clothing, materials, and articles within beryllium work areas;
 - (v) Procedures for keeping surfaces as free as practicable of beryllium;
 - (vi) Procedures for minimizing the migration of beryllium from beryllium work areas to other locations within or outside the workplace;
 - (vii) A list of engineering controls, work practices, and respiratory protection required by subsection WAC 296-62-08513 (2), Engineering and work practice controls, of this rule;
 - (viii) A list of personal protective clothing and equipment required by section WAC 296-62-08517, Personal protective clothing and equipment, of this rule; and
 - (ix) Procedures for removing, laundering, storing, leaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators.
- (b) The employer must review and evaluate the effectiveness of each written exposure control plan at least annually and update it, as necessary, when:

- (i) 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;
 - (ii) 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;
 - (iii) The employer has any reason to believe that new or additional airborne exposure is occurring or will occur.
- (c) The employer 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 Chapter 296-802 WAC, Employee Medical and Exposure Records.
- (2) Engineering and work practice controls.**
- (a) Where exposures are, or can reasonably be expected to be, at or above the action level, the employer must ensure that at least one of the following is in place to reduce airborne exposure:
 - (i) Material and/or process substitution;
 - (ii) Isolation, such as ventilated partial or full enclosures;
 - (iii) Local exhaust ventilation, such as at the points of operation, material handling, and transfer; or
 - (iv) Process control, such as wet methods and automation.
 - (b) An employer is exempt from using these controls to the extent that:
 - (i) The employer can establish that such controls are not feasible; or
 - (ii) The employer 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.
 - (c) If airborne exposure exceeds the TWA PEL or STEL after implementing the listed control(s) in this subsection, the employer must implement additional or enhanced

engineering and work practice controls to reduce airborne exposure to or below the exposure limit(s) exceeded.

- (d) Wherever the employer demonstrates that it is not feasible to reduce airborne exposure to or below the PELs by the engineering and work practice controls, the employer must implement and maintain engineering and work practice controls to reduce airborne exposure to the lowest levels feasible and supplement these controls by using respiratory protection in accordance with section WAC 296-62-08515, Respiratory protection, of this rule.

- (3) **Prohibition of rotation.** The employer must not rotate employees to different jobs to achieve compliance with the PELs.

WAC 296-62-08515 Respiratory protection.

- (1) **General.** The employer must provide respiratory protection at no cost to the employee and ensure that each employee uses respiratory protection:
 - (a) 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;
 - (b) 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;
 - (c) 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;
 - (d) During emergencies; and
 - (e) When an employee who is eligible for medical removal under WAC 296-62-08524(1) chooses to remain in a job with airborne exposure at or above the action level, as permitted by WAC 296-62-08524(2)(b) .
- (2) **Respiratory protection program.** Where this standard requires an employer to provide respiratory protection, the selection and use of such respiratory protection must be in accordance with Chapter 296-842 WAC, Safety Standards for Respirators.
- (3) The employer must provide at no cost to the employee a powered air-purifying respirator (PAPR) instead of a negative pressure respirator when

- (a) Respiratory protection is required by this standard;
- (b) An employee entitled to such respiratory protection requests a PAPR; and
- (c) The PAPR provides adequate protection to the employee in accordance with subsection WAC 296-62-08515(2), Respiratory protection program, of this rule.

WAC 296-62-08517 Personal protective clothing and equipment.

- (1) **Provision and use.** The employer 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 subsection WAC 296-62-08513(1) and other applicable requirements for personal protective equipment (WAC 206-800-160 Personal protective equipment (PPE). Chapter 296-155 WAC, Part C, Personal protective and life saving equipment. WAC 296-304-090 Personal protective equipment (PPE)-General requirements.):
 - (a) Where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; or
 - (b) Where there is a reasonable expectation of dermal contact with beryllium.
- (2) **Removal and storage.**
 - (a) The employer 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 tasks involving beryllium, or when personal protective clothing or equipment becomes visibly contaminated with beryllium, whichever comes first.
 - (b) The employer must ensure that each employee removes beryllium-contaminated personal protective clothing and equipment as specified in the written exposure control plan required by subsection WAC 296-62-08513(1).
 - (c) The employer 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 required by subsection WAC 296-62-08513(1) .
 - (d) The employer 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.

- (e) When personal protective clothing or equipment required by this standard is removed from the workplace for laundering, cleaning, maintenance or disposal, the employer 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 with subsection WAC 296-62-08525(3) and Chapter 296-901 WAC, Hazard Communication.

(3) Cleaning and replacement.

- (a) The employer must ensure that all reusable personal protective clothing and equipment required by this standard is cleaned, laundered, repaired, and replaced as needed to maintain its effectiveness.
- (b) The employer must ensure that beryllium is not removed from personal protective clothing and equipment by blowing, shaking or any other means that disperses beryllium into the air.
- (c) The employer 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 airborne exposure to and dermal contact with beryllium and that the personal protective clothing and equipment must be handled in accordance with this standard.

WAC 296-62-08519, Hygiene areas and practices.

- (1) **General.** For each employee working in a beryllium work area, the employer must:
 - (a) Provide readily accessible washing facilities in accordance with this standard and other applicable sanitation standards (WAC 296-800-230 Drinking water, bathrooms, washing facilities and waste disposal. WAC 296-155-140 Sanitation. WAC 296-304-06002 Sanitation.) to remove beryllium from the hands, face, and neck; and
 - (b) 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 requirements of subsection WAC 296-62-08519(1)(a), the employer must provide employees who work in a beryllium work area with a

designated change room in accordance with this standard and other applicable sanitation standards (WAC 296-800-230 Drinking water, bathrooms, washing facilities and waste disposal. WAC 296-155-140 Sanitation. WAC 296-304-06002 Sanitation.) where employees are required to remove their personal clothing.

(3) Showers.

(a) The employer must provide showers in accordance with other applicable sanitation standards (WAC 296-800-230 Drinking water, bathrooms, washing facilities and waste disposal. WAC 296-155-140 Sanitation. WAC 296-304-06002 Sanitation.) where:

(i) Airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; and

(ii) Beryllium can reasonably be expected to contaminate employees' hair or body parts other than hands, face, and neck.

(b) Employers required to provide showers must ensure that each employee showers at the end of the work shift or work activity if:

(i) The employee reasonably could have had airborne exposure above the TWA PEL or STEL; and

(ii) Beryllium could reasonably have contaminated the employee's hair or body parts other than hands, face, and neck.

(4) Eating and drinking areas. Wherever the employer allows employees to consume food or beverages at a worksite where beryllium is present, the employer 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 personal protective clothing or equipment unless, prior to entry, surface beryllium has been removed from the clothing or equipment by methods that do not disperse beryllium into the air or onto an employee's body; and

(c) Eating and drinking facilities provided by the employer are in accordance with other applicable sanitation standards (WAC 296-800-230 Drinking water, bathrooms, washing facilities and waste disposal. WAC 296-155-140 Sanitation. WAC 296-304-06002 Sanitation.).

- (5) **Prohibited activities.** The employer must ensure that no employees eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas and other work areas where there is a reasonable expectation of exposure above the TWA PEL or STEL

WAC 296-62-08521 Housekeeping.

(1) **General.**

- (a) The employer 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 subsection WAC 296-62-08513(1) and the cleaning methods required this subsection; and
- (b) The employer 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 subsection WAC 296-62-08513(1) and the cleaning methods required under this subsection.

(2) **Cleaning methods.**

- (a) The employer 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.
- (b) The employer 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.
- (c) The employer 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.
- (d) Where employees use dry sweeping, brushing, or compressed air to clean beryllium contaminated surfaces, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with WAC 296-62-08515, Respiratory protection, and WAC 296-62-08517, Personal protective clothing and equipment.
- (e) The employer 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.

(3) **Disposal.** The employer must ensure that:

- (a) Materials designated for disposal that contain or are contaminated with beryllium are disposed of in sealed, impermeable enclosures, such as bags or containers, that are labeled in accordance with WAC 296-62-08525(3), Warning labels.
- (b) Materials designated for recycling that contain or are contaminated with beryllium are cleaned to be as free as practicable of surface beryllium contamination and labeled in accordance with subsection WAC 296-62-08525(3) , or placed in sealed, impermeable enclosures, such as bags or containers, that are labeled in accordance with subsection WAC 296-62-08525(3) .

WAC 296-62-08523 Medical surveillance.

(1) **General.**

- (a) The employer 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:
- (b) Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;
- (c) Who shows signs or symptoms of CBD or other beryllium-related health effects;
- (d) Who is exposed to beryllium during an emergency; or
- (e) Whose most recent written medical opinion required by this section recommends periodic medical surveillance.
- (f) The employer 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.** The employer must provide a medical examination:

- (a) Within 30 days after determining that:
 - (i) An employee meets the criteria of paragraph WAC 296-62-08523(1)(a)(i), unless the employee has received a medical examination, provided in accordance with this standard, within the last two years; or Who shows signs or symptoms of CBD or other beryllium-related health effects;
 - (ii) An employee meets the criteria of paragraph WAC 296-62-08523(1)(a)(ii) or (iii).

- (b) At least every two years thereafter for each employee who continues to meet the criteria of WAC 296-62-08523(1)(a)(i), (ii), or (iv).
- (c) At the termination of employment for each employee who meets any of the criteria of WAC 296-62-08523(1)(a) 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.

(3) Contents of examination.

- (a) The employer 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.
- (b) The employer must ensure that the employee is offered a medical examination that includes:
 - (i) Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;
 - (ii) A physical examination with emphasis on the respiratory system;
 - (iii) A physical examination for skin rashes;
 - (iv) 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);
 - (v) 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.
 - (vi) A low dose computed tomography (LDCT) scan, when recommended by the PLHCP after considering the employee's history of exposure to beryllium along with other risk factors, such as smoking history, family medical history, sex, age, and presence of existing lung disease; and

(vii) Any other test deemed appropriate by the PLHCP.

(4) **Information provided to the PLHCP.** The employer must ensure that the examining PLHCP (and the agreed-upon CBD diagnostic center, if an evaluation is required under WAC 296-62-08523(7)) has a copy and must provide the following information, if known:

- (a) A description of the employee's former and current duties that relate to the employee's airborne exposure to and dermal contact with beryllium;
- (b) The employee's former and current levels of airborne exposure;
- (c) 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
- (d) Information from records of employment-related medical examinations previously provided to the employee, currently within the control of the employer, after obtaining written consent from the employee.

(5) **Licensed physician's written medical report for the employee.** The employer 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 WAC 296-62-08523 (3)(b)(v)) and that the PLHCP explains the results of the examination to the employee. The written medical report must contain:

- (a) A statement indicating the results of the medical examination, including the licensed physician's opinion as to whether the employee has
 - (i) Any detected medical condition, such as CBD or beryllium sensitization (i.e., the employee is confirmed positive, as defined in paragraph (b)), that may place the employee at increased risk from further airborne exposure, and
 - (ii) Any medical conditions related to airborne exposure that require further evaluation or treatment.
- (b) Any recommendations on:
 - (i) The employee's use of respirators, protective clothing, or equipment; or
 - (ii) Limitations on the employee's airborne exposure to beryllium.

- (c) 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.
- (d) If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for continued periodic medical surveillance.
- (e) 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 WAC 296-62-08524 .

(6) Licensed physician's written medical opinion for the employer.

- (a) The employer must obtain a written medical opinion from the licensed physician within 45 days of the medical examination (including any follow-up BeLPT required under WAC 296-62-08523(3)(b)(v)). The written medical opinion must contain only the following:
 - (i) The date of the examination;
 - (ii) A statement that the examination has met the requirements;
 - (iii) Any recommended limitations on the employee's use of respirators, protective clothing, or equipment; and
 - (iv) 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;
- (b) If the employee provides written authorization, the written opinion must also contain any recommended limitations on the employee's airborne exposure to beryllium.
- (c) 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.
- (d) 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.

- (e) 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 WAC 296-62-08524.
- (f) The employer must ensure that each employee receives a copy of the written medical opinion described in WAC 296-62-08523(6) within 45 days of any medical examination (including any follow-up BeLPT required under WAC 296-62-08523(3)(b)(v)) performed for that employee.

(7) CBD diagnostic center.

- (a) The employer must provide an evaluation at no cost to the employee at a CBD diagnostic center that is mutually agreed upon by the employer and the employee. The examination must be provided within 30 days of:
 - (i) The employer's receipt of a physician's written medical opinion to the employer that recommends referral to a CBD diagnostic center; or
 - (ii) The employee presenting to the employer 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.
- (b) The employer must ensure that the employee receives a written medical report from the CBD diagnostic center that contains all the information required in WAC 296-62-08523(5)(a), (b), (c), and (e) and that the PLHCP explains the results of the examination to the employee within 30 days of the examination.
- (c) The employer 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 WAC 296-62-08523(6)(a), 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 WAC 296-62-08523(6)(b), (d), and (e), if applicable.
- (d) The employer must ensure that each employee receives a copy of the written medical opinion from the CBD diagnostic center described in WAC 296-62-08523(7) within 30 days of any medical examination performed for that employee.
- (e) After an employee has received the initial clinical evaluation at a CBD diagnostic center described in WAC 296-62-08523(7)(a) , the employee may choose to have any subsequent medical examinations for which the employee is eligible under WAC 296-62-08523 performed at a CBD diagnostic center mutually agreed upon by the

employer and the employee, and the employer must provide such examinations at no cost to the employee.

WAC 296-62-08524 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:
 - (a) The employee provides the employer with:
 - (i) A written medical report indicating a confirmed positive finding or CBD diagnosis; or
 - (ii) A written medical report recommending removal from airborne exposure to beryllium in accordance with WAC 296-62-08523(5)(e) or (7)(b); or
 - (b) The employer receives a written medical opinion recommending removal from airborne exposure to beryllium in accordance with WAC 296-62-08523(6)(e) or (7)(c) .
- (2) If an employee is eligible for medical removal, the employer must provide the employee with the employee's choice of:
 - (a) Removal as described in WAC 296-62-08524(3) ; or
 - (b) Remaining in a job with airborne exposure at or above the action level, provided that the employer provides, and ensures that the employee uses, respiratory protection that complies with section WAC 296-62-08515, Respiratory protection, of this rule whenever airborne exposures are at or above the action level.
- (3) If the employee chooses removal:
 - (a) 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, the employer must remove the employee to that job. The employer 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.
 - (b) If comparable work is not available, the employer 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 WAC 296-62-08524(3)(i) becomes available, whichever comes first.

- (4) The employer's 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.

WAC 296-62-08525 Communication of hazards.

(1) General.

- (a) Chemical manufacturers, importers, distributors, and employers must comply with all requirements of Chapter 296-901 WAC, Hazard Communication, for beryllium.
- (b) 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.
- (c) Employers 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 Chapter 296-901 WAC, Hazard Communication, and WAC 296-62-08525(4) .

(2) Warning signs.

- (a) **Posting.** The employer 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.
- (b) **Sign specification.**
- (i) The employer must ensure that the warning signs required by WAC 296-62-08525(2)(a) are legible and readily visible.
- (ii) The employer must ensure each warning sign required by WAC 296-62-08525(2)(a) bears the following legend:

DANGER
REGULATED AREA
BERYLLIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

WEAR RESPIRATORY PROTECTION AND PERSONAL
PROTECTIVE CLOTHING AND EQUIPMENT IN THIS AREA

- (3) **Warning labels.** Consistent with Chapter 296-901 WAC, Hazard Communication,, the employer must label each bag and container of clothing, equipment, and materials contaminated with beryllium, and must, at a minimum, include the following on the label:

DANGER
CONTAINS BERYLLIUM
MAY CAUSE CANCER
(a) CAUSES DAMAGE TO LUNGS
AVOID CREATING DUST
DO NOT GET ON SKIN

(4) **Employee information and training.**

- (a) For each employee who has, or can reasonably be expected to have, airborne exposure to or dermal contact with beryllium:
- (i) The employer must provide information and training in accordance with Chapter 296-901 WAC, Hazard Communication;
 - (ii) The employer must provide initial training to each employee by the time of initial assignment; and
 - (iii) The employer must repeat the training required under this standard annually for each employee.
- (b) The employer 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:
- (i) The health hazards associated with airborne exposure to and contact with beryllium, including the signs and symptoms of CBD;
 - (ii) The written exposure control plan, with emphasis on the location(s) of beryllium work areas, including any regulated areas, and the specific nature of operations that could result in airborne exposure, especially airborne exposure above the TWA PEL or STEL;
 - (iii) The purpose, proper selection, fitting, proper use, and limitations of personal protective clothing and equipment, including respirators;

- (iv) Applicable emergency procedures;
 - (v) Measures employees can take to protect themselves from airborne exposure to and contact with beryllium, including personal hygiene practices;
 - (vi) The purpose and a description of the medical surveillance program required by WAC 296-62-08523 including risks and benefits of each test to be offered;
 - (vii) The purpose and a description of the medical removal protection provided under WAC 296-62-08524 ;
 - (viii) The contents of the standard; and
 - (ix) The employee's right of access to records under Chapter 296-802 WAC, Employee medical and Exposure Records,.
- (c) 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, the employer must provide additional training to those employees affected by the change in airborne exposure.
- (d) Employee information. The employer must make a copy of this rule and its appendices readily available at no cost to each employee and designated employee representative(s).

WAC 296-62-08527 Recordkeeping

(1) Air monitoring data.

- (a) The employer must make and maintain a record of all exposure measurements taken to assess airborne exposure as prescribed in section WAC 296-62-08509, Exposure assessment.
- (b) This record must include at least the following information:
 - (i) The date of measurement for each sample taken;
 - (ii) The task that is being monitored;
 - (iii) The sampling and analytical methods used and evidence of their accuracy;
 - (iv) The number, duration, and results of samples taken;

(v) The type of personal protective clothing and equipment, including respirators, worn by monitored employees at the time of monitoring; and

(vi) The name, social security number, and job classification of each employee represented by the monitoring, indicating which employees were actually monitored.

(c) The employer must ensure that exposure records are maintained and made available in accordance with Chapter 296-802 WAC, Employee medical and Exposure Records.

(2) Objective data.

(a) Where an employer uses objective data to satisfy the exposure assessment requirements under WAC 296-62-08509(b), the employer must make and maintain a record of the objective data relied upon.

(b) This record must include at least the following information:

(i) The data relied upon;

(ii) The beryllium-containing material in question;

(iii) The source of the objective data;

(iv) A description of the process, task, or activity on which the objective data were based; and

(v) Other data relevant to the process, task, activity, material, or airborne exposure on which the objective data were based.

(c) The employer must ensure that objective data are maintained and made available in accordance with Chapter 296-802 WAC, Employee medical and Exposure Records.

(3) Medical surveillance.

(a) The employer must make and maintain a record for each employee covered by medical surveillance under WAC 296-62-08523.

(b) The record must include the following information about each employee:

(i) Name, social security number, and job classification;

- (ii) A copy of all licensed physicians' written medical opinions for each employee;
and
 - (iii) A copy of the information provided to the PLHCP as required by WAC 296-62-08523(4).
- (c) The employer must ensure that medical records are maintained and made available in accordance with Chapter 296-802 WAC, Employee medical and Exposure Records.
- (4) **Training.**
- (a) At the completion of any training required by this standard, the employer must prepare a record that indicates the name, social security number, and job classification of each employee trained, the date the training was completed, and the topic of the training.
 - (b) This record must be maintained for three years after the completion of training.
- (5) **Access to records.** The employer shall ensure records are maintained and made available in accordance with chapter 296-802 WAC, Employee medical and exposure records.
- (6) **Transfer of records.** The employer must comply with the requirements involving transfer of records set forth in Chapter 296-802 WAC, Employee medical and Exposure Records.

WAC 296-62-08529 Dates

- (1) **Effective date.** This standard shall become effective [based on date of promulgation].
- (2) **Compliance dates.** All obligations of this standard commence and become enforceable on [based on date of promulgation], except:
 - (a) Change rooms and showers required by WAC 296-62-08519 of this standard must be provided by March 11, 2019; and
 - (b) Engineering controls required by section WAC 296-62-08513, Methods of compliance, of this rule must be implemented by March 10, 2020.

WAC 296-62-08529 Appendix

Appendix A – Control Strategies to Minimize Beryllium Exposure of this standard is non-mandatory.

Appendix A to § 1910.1024 -- Control Strategies to Minimize Beryllium Exposure (NonMandatory)

Paragraph (f)(2)(i) of this standard requires employers to use one or more of the control methods listed in paragraph (f)(2)(i) to minimize worker exposure in each operation in a beryllium work area, unless the operation is exempt under paragraph (f)(2)(ii). This appendix sets forth a non-exhaustive list of control options that employers could use to comply with paragraph (f)(2)(i) for a number of specific beryllium operations.

Table A.1: Exposure Control Recommendations

Operation	Minimal Control Strategy*	Application Group
Beryllium Oxide Forming (e.g., pressing, extruding)	For pressing operations: (1) Install local exhaust ventilation (LEV) on oxide press tables, oxide feed drum breaks, press tumblers, powder rollers, and die set disassembly stations; (2) Enclose the oxide presses; and (3) Install mechanical ventilation (make-up air) in processing areas. For extruding operations: (1) Install LEV on extruder powder loading hoods, oxide supply bottles, rod breaking operations, centerless grinders, rod laydown tables, dicing operations, surface grinders, discharge end of extrusion presses; (2) Enclose the centerless grinders; and (3) Install mechanical ventilation (make-up air) in processing areas.	Primary Beryllium Production; Beryllium Oxide Ceramics and Composites
Chemical Processing Operations (e.g., leaching, pickling, degreasing, etching, plating)	For medium and high gassing operations (1) Perform operation with a hood having a maximum of one open side; and (2) Design process so as to minimize spills; if accidental spills occur, perform immediate cleanup.	Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Copper Rolling, Drawing and Extruding

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<p>Finishing (e.g., grinding, sanding, polishing, deburring)</p>	<p>) Perform portable finishing operations in a ventilated hood. The hood should include both downdraft and backdraft ventilation, and have at least two sides and a top.</p> <p>) Perform stationary finishing operations using a ventilated and enclosed hood at the point of operation. The grinding wheel of the stationary unit should be enclosed and ventilated.</p>	<p>Secondary Smelting; Fabrication of Beryllium Alloy Products; Dental Labs</p>
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<p>Furnace Operations (e.g., Melting and Casting)</p>	<p>) Use LEV on furnaces, pelletizer; arc furnace ingot machine discharge; pellet sampling; arc furnace bins and conveyors; beryllium hydroxide drum dumper and dryer; furnace rebuilding; furnace tool holders; arc furnace tundish and tundish skimming, tundish preheat hood, and tundish cleaning hoods; dross handling equipment and drums; dross recycling; and tool repair station, charge make-up station, oxide screener, product sampling locations, drum changing stations, and drum cleaning stations.</p> <p>) Use mechanical ventilation (make-up air) in furnace building.</p>	<p>Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Nonferrous Foundries; Secondary Smelting</p>
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<p>Machining</p>	<p>) Use (1) LEV consistent with ACGIH® ventilation guidelines on deburring hoods, wet surface grinder enclosures, belt sanding hoods, and electrical discharge machines (for operations such as polishing, lapping, and buffing);</p> <p>) high velocity low volume hoods or ventilated enclosures on lathes, vertical mills, CNC mills, and tool grinding operations;</p> <p>) for beryllium oxide ceramics, LEV on lapping, dicing, and laser cutting; and (4) wet methods (e.g., coolants).</p>	<p>Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Copper Rolling, Drawing, and Extruding; Precision Turned Products</p>
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<p>Mechanical Processing (e.g., material handling (including scrap), sorting, crushing, screening, pulverizing, shredding, pouring, mixing, blending)</p>	<p>) Enclose and ventilate sources of emission;</p> <p>) Prohibit open handling of materials;</p> <p>and</p> <p>) Use mechanical ventilation (make-up air) in processing areas.</p>	<p>Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Aluminum and Copper Foundries; Secondary Smelting</p>
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<p>Metal Forming (e.g., rolling, drawing, straightening, annealing, extruding)</p>	<p>) For rolling operations, install LEV on mill stands and reels such that a hood extends the length of the mill;) For point and chamfer operations, install LEV hoods at both ends of the rod;) For annealing operations, provide an inert atmosphere for annealing furnaces, and LEV hoods at entry and exit points; (4) For swaging operations, install LEV on the cutting head;) For drawing, straightening, and extruding operations, install LEV at entry and exit points; and) For all metal forming operations, install mechanical ventilation (make-up air) for processing areas.</p>	<p>Primary Beryllium Production; Copper Rolling, Drawing, and Extruding; Fabrication of Beryllium Alloy Products</p>
<p>Welding</p>	<p>For fixed welding operations: Enclose work locations around the source of fume generation and use local exhaust ventilation; and Install close capture hood enclosure designed so as to minimize fume emission from the enclosure welding operation. For manual operations: (1) Use portable local exhaust and general ventilation.</p>	<p>Primary Beryllium Production; Fabrication of Beryllium Alloy Products; Welding</p>

* All LEV specifications should be in accordance with the ACGIH® Publication No. 2094, "Industrial Ventilation – A Manual of Recommended Practice" wherever applicable.