

STANDARDS PRESENTATION
TO
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,
TITLE 8, DIVISION 1, CHAPTER 4

Add new Section 5205 as follows:

§ 5205. ~~Perchloric Acid and Oxonium Perchlorate. (Repealed)~~ Beryllium.

(a) Scope and application.

(1) This standard applies to occupational exposure to beryllium in all forms, compounds, and mixtures in general industry, except those articles and materials exempted by subsections (a)(2) and (a)(3).

(2) This standard does not apply to articles, as defined in Section 5194(c) (Hazard Communication standard (HCS)), 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.

(b) Definitions. As used in this standard:

Action level means 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 mean the exposure to airborne beryllium that would occur if the employee were not using a respirator.

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 work area means 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 means 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.

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Chief means the Chief of the Division of Occupational Safety and Health, or designee.

Chronic beryllium disease (CBD) means a chronic lung disease associated with airborne exposure to beryllium.

Confirmed positive means 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.

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 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 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.

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 subsection (k).

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, Section 5205.

(c) Permissible Exposure Limits (PELs).

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(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.

(d) 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 (d)(2) or the scheduled monitoring option in subsection (d)(3).

(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 (d)(3). 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.

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(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 (d)(4).

(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 (d)(4).

(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 subsection (d) 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 subsection (d), 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.

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(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.

(e) 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 (b) are met.

(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.

(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 (m)(2).

(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 (d)(7); and

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(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 subsection (g); and

(B) Personal protective clothing and equipment in accordance with subsection (h).

(f) Methods of compliance.

(1) Written exposure control plan.

(A) The employer must establish, implement, and maintain a written exposure control plan, which must contain:

1. A list of operations and job titles reasonably expected to involve airborne exposure to or dermal contact with beryllium;

2. A list of operations and job titles reasonably expected to involve airborne exposure at or above the action level;

3. A list of operations and job titles reasonably expected to involve airborne exposure above the TWA PEL or STEL;

4. Procedures for minimizing cross-contamination, including preventing the transfer of beryllium between surfaces, equipment, clothing, materials, and articles within beryllium work areas;

5. Procedures for keeping surfaces as free as practicable of beryllium;

6. Procedures for minimizing the migration of beryllium from beryllium work areas to other locations within or outside the workplace;

7. A list of engineering controls, work practices, and respiratory protection required by subsection (f)(2);

8. A list of personal protective clothing and equipment required by subsection (h); and

9. Procedures for removing, laundering, storing, cleaning, repairing, and disposing of beryllium-contaminated personal protective clothing and equipment, including respirators.

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(B) The employer must review and evaluate the effectiveness of each written exposure control plan at least annually and update it, as necessary, when:

1. 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;
2. The employer is notified that an employee is eligible for medical removal in accordance with subsection (l)(1), referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to or dermal contact with beryllium; or
3. 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 Section 3204(e) (Access to Employee Exposure and Medical Records).

(2) Engineering and work practice controls.

(A) For each operation in a beryllium work area that releases airborne beryllium, the employer must ensure that at least one of the following is in place to reduce airborne exposure:

1. Material and/or process substitution;
2. Isolation, such as ventilated partial or full enclosures;
3. Local exhaust ventilation, such as at the points of operation, material handling, and transfer; or
4. Process control, such as wet methods and automation.

(B) An employer is exempt from using the controls listed in subsection (f)(2)(A) to the extent that:

1. The employer can establish that such controls are not feasible; or
2. 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.

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(C) If airborne exposure exceeds the TWA PEL or STEL after implementing the control(s) required by subsection (f)(2)(A), 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 required by subsections (f)(2)(A) and (f)(2)(C), 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 subsection (g).

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

(g) 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 subsection (l)(1) chooses to remain in a job with airborne exposure at or above the action level, as permitted by subsection (l)(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 Section 5144 (Respiratory Protective Equipment).

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(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 (g)(2).

(h) 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 (f)(1) and Section 1514 (Personal Protective Devices):

(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 (f)(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 (f)(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

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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 (m)(3) and Section 5194 (HCS).

(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.

(i) 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 Section 3366 (Washing Facilities) 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 (i)(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 Section 3367 (Change Rooms) where employees are required to remove their personal clothing.

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(3) Showers.

(A) The employer must provide showers in accordance with Section 3366 (Washing Facilities) where:

1. Airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL; and
2. Beryllium can reasonably be expected to contaminate employees' hair or body parts other than hands, face, and neck.

(B) Employers required to provide showers under subsection (i)(3)(A) must ensure that each employee showers at the end of the work shift or work activity if:

1. The employee reasonably could have had airborne exposure above the TWA PEL or STEL; and
2. 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 Section 3368 (Consumption of Food and Beverages).

(5) Prohibited activities. The employer must ensure that no employees eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

(j) Housekeeping.

(1) General.

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(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 (f)(1) and the cleaning methods required under subsection (j)(2); 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 (f)(1) and the cleaning methods required under subsection (j)(2).

(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 subsections (g) and (h).

(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 subsection (m)(3); and

(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 (m)(3), or placed in sealed, impermeable enclosures, such as bags or containers, that are labeled in accordance with subsection (m)(3).

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(k) Medical surveillance.

(1) General.

(A) The employer must make medical surveillance required by this subsection available at no cost to the employee, and at a reasonable time and place, to each employee:

1. Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;
2. Who shows signs or symptoms of CBD or other beryllium-related health effects;
3. Who is exposed to beryllium during an emergency; or
4. Whose most recent written medical opinion required by subsection (k)(6) or (k)(7) recommends periodic medical surveillance.

(B) 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:

1. An employee meets the criteria of subsection (k)(1)(A)1., unless the employee has received a medical examination, provided in accordance with this standard, within the last two years; or
2. An employee meets the criteria of subsection (k)(1)(A)2. or 3.

(B) At least every two years thereafter for each employee who continues to meet the criteria of subsection (k)(1)(A)1., 2., or 4.

(C) At the termination of employment for each employee who meets any of the criteria of subsection (k)(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.

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(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:

1. 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;

2. A physical examination with emphasis on the respiratory system;

3. A physical examination for skin rashes;

4. 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);

5. 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.

6. 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

7. 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 subsection (k)(7)) has a copy of this standard 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;

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(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 subsection (k)(3)(B)5.) 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

1. Any detected medical condition, such as CBD or beryllium sensitization (i.e., the employee is confirmed positive, as defined in subsection (b)), that may place the employee at increased risk from further airborne exposure, and

2. Any medical conditions related to airborne exposure that require further evaluation or treatment.

(B) Any recommendations on:

1. The employee's use of respirators, protective clothing, or equipment; or

2. 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 subsection (l).

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(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 subsection (k)(3)(B)5.). The written medical opinion must contain only the following:

1. The date of the examination;
2. A statement that the examination has met the requirements of this standard;
3. Any recommended limitations on the employee's use of respirators, protective clothing, or equipment; and
4. 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 subsection (l).

(F) The employer must ensure that each employee receives a copy of the written medical opinion described in subsection (k)(6) within 45 days of any medical examination (including any follow-up BeLPT required under subsection (k)(3)(B)5.) performed for that employee.

(7) CBD diagnostic center.

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(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:

1. The employer's receipt of a physician's written medical opinion to the employer that recommends referral to a CBD diagnostic center; or
2. 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 subsection (k)(5)(A), (B), (D), 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 subsection (k)(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 subsections (k)(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 subsection (k)(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 subsection (k)(7)(A), the employee may choose to have any subsequent medical examinations for which the employee is eligible under subsection (k) 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.

(I) 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:

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1. A written medical report indicating a confirmed positive finding or CBD diagnosis; or
2. A written medical report recommending removal from airborne exposure to beryllium in accordance with subsection (k)(5)(E) or (k)(7)(B); or
 - (B) The employer receives a written medical opinion recommending removal from airborne exposure to beryllium in accordance with subsection (k)(6)(E) or (k)(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 subsection (l)(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 subsection (g) 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 subsection (l)(3)(A) 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.
- (m) Communication of hazards.
- (1) General.

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(A) Chemical manufacturers, importers, distributors, and employers must comply with all requirements of Section 5194 (HCS) 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 Section 5194 (HCS) and subsection (m)(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.

1. The employer must ensure that the warning signs required by subsection (m)(2)(A) are legible and readily visible.

2. The employer must ensure each warning sign required by subsection (m)(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

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(3) Warning labels. Consistent with Section 5194 (HCS), 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

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:

1. The employer must provide information and training in accordance with Section 5194(h) (HCS);
2. The employer must provide initial training to each employee by the time of initial assignment; and
3. 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:

1. The health hazards associated with airborne exposure to and contact with beryllium, including the signs and symptoms of CBD;
2. 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;

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3. The purpose, proper selection, fitting, proper use, and limitations of personal protective clothing and equipment, including respirators;
 4. Applicable emergency procedures;
 5. Measures employees can take to protect themselves from airborne exposure to and contact with beryllium, including personal hygiene practices;
 6. The purpose and a description of the medical surveillance program required by subsection (k) including risks and benefits of each test to be offered;
 7. The purpose and a description of the medical removal protection provided under subsection (l);
 8. The contents of the standard; and
 9. The employee's right of access to records under Section 3204 (Access to Employee Exposure and Medical 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 standard and its appendices readily available at no cost to each employee and designated employee representative(s).
- (n) 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 subsection (d).
 - (B) This record must include at least the following information:
 1. The date of measurement for each sample taken;
 2. The task that is being monitored;

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3. The sampling and analytical methods used and evidence of their accuracy;
4. The number, duration, and results of samples taken;
5. The type of personal protective clothing and equipment, including respirators, worn by monitored employees at the time of monitoring; and
6. 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 Section 3204 (Access to Employee Exposure and Medical Records).

(2) Objective data.

(A) Where an employer uses objective data to satisfy the exposure assessment requirements under subsection (d)(2), the employer must make and maintain a record of the objective data relied upon.

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

1. The data relied upon;
2. The beryllium-containing material in question;
3. The source of the objective data;
4. A description of the process, task, or activity on which the objective data were based; and
5. 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 Section 3204 (Access to Employee Exposure and Medical Records).

(3) Medical surveillance.

(A) The employer must make and maintain a record for each employee covered by medical surveillance under subsection (k).

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

1. Name, social security number, and job classification;
2. A copy of all licensed physicians' written medical opinions for each employee; and
3. A copy of the information provided to the PLHCP as required by subsection (k)(4).

(C) The employer must ensure that medical records are maintained and made available in accordance with Section 3204 (Access to Employee Exposure and Medical 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. Upon request, the employer must make all records maintained as a requirement of this standard available for examination and copying to the Chief, the Director, each employee, and each employee's designated representative(s) in accordance with Section 3204 (Access to Employee Exposure and Medical Records).

(6) Transfer of records. The employer must comply with the requirements involving transfer of records set forth in Section 3204 (Access to Employee Exposure and Medical Records).

(o) Dates.

(1) Effective date. This standard shall become effective (60 days after OAL approval).

(2) Compliance dates. All obligations of this standard commence and become enforceable on March 12, 2018, except:

(A) Change rooms and showers required by subsection (i) must be provided by March 11, 2019; and

(B) Engineering controls required by subsection (f) must be implemented by March 10, 2020.

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(p) Appendix. Appendix A—Control Strategies to Minimize Beryllium Exposure of this standard is non-mandatory.

**Appendix A to § 5205—
Control Strategies To Minimize Beryllium Exposure
(Non-Mandatory)**

Subsection (f)(2)(A) requires employers to use one or more of the control methods listed in subsection (f)(2)(A) to minimize worker exposure in each operation in a beryllium work area, unless the operation is exempt under subsection (f)(2)(B). This appendix sets forth a non-exhaustive list of control options that employers could use to comply with subsection (f)(2)(A) 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.
Finishing (e.g., grinding, sanding, polishing, deburring).	(1) 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 (2) 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.	Secondary Smelting; Fabrication of Beryllium Alloy Products; Dental Labs.

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Operation	Minimal control strategy	Application group
Furnace Operations (e.g., Melting and Casting).	<p>(1) 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>(2) Use mechanical ventilation (make-up air) in furnace building.</p>	Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Nonferrous Foundries; Secondary Smelting.
Machining	<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>(2) high velocity low volume hoods or ventilated enclosures on lathes, vertical mills, CNC mills, and tool grinding operations;</p> <p>(3) for beryllium oxide ceramics, LEV on lapping, dicing, and laser cutting; and</p> <p>(4) wet methods (e.g., coolants).</p>	Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Copper Rolling, Drawing, and Extruding; Precision Turned Products.
Mechanical Processing (e.g., material handling (including scrap), sorting, crushing, screening, pulverizing, shredding, pouring, mixing, blending).	<p>(1) Enclose and ventilate sources of emission;</p> <p>(2) Prohibit open handling of materials; and</p> <p>(3) Use mechanical ventilation (make-up air) in processing areas.</p>	Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Aluminum and Copper Foundries; Secondary Smelting.
Metal Forming (e.g., rolling, drawing, straightening, annealing, extruding)	<p>(1) For rolling operations, install LEV on mill stands and reels such that a hood extends the length of the mill;</p> <p>(2) For point and chamfer operations, install LEV hoods at both ends of the rod;</p> <p>(3) For annealing operations, provide an inert atmosphere for annealing furnaces, and LEV hoods at entry and exit points;</p>	Primary Beryllium Production; Copper Rolling, Drawing, and Extruding; Fabrication of Beryllium Alloy Products.

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Operation	Minimal control strategy	Application group
Welding	<p>(4) For swaging operations, install LEV on the cutting head</p> <p>(5) For drawing, straightening, and extruding operations, install LEV at entry and exit points; and</p> <p>(6) For all metal forming operations, install mechanical ventilation (make-up air) for processing areas</p> <p>For fixed welding operations:</p> <p>(1) Enclose work locations around the source of fume generation and use local exhaust ventilation; and</p> <p>(2) Install close capture hood enclosure designed so as to minimize fume emission from the enclosure welding operation.</p> <p>For manual operations:</p> <p>(1) Use portable local exhaust and general ventilation</p>	Primary Beryllium Production; Fabrication of Beryllium Alloy Products; Welding

NOTE: Authority cited: Sections 142.3, 9020, 9030 and 9040, Labor Code. Reference: Sections 142.3, 9004(d), 9009, 9020, 9031 and 9040, Labor Code.