UNITED STATES COURT OF APPEALS FOR THE EIGHTH CIRCUIT

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|) Civ. Nos. 17-1124, |
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SETTLEMENT AGREEMENT

The parties to this Settlement Agreement ("Agreement") are the Occupational Safety and Health Administration, United States Department of Labor ("OSHA") and Materion Brush Inc.; Airborn, Inc. and Mead Metals; and National Association of Manufacturers ("Petitioners").

WHEREAS, on January 9, 2017, OSHA promulgated and published in the Federal Register at 82 Fed. Reg. 2470–2757 a final rule entitled "Occupational Exposure to Beryllium," which is codified at 29 C.F.R. § 1910.1024 (hereinafter, "the Beryllium Standard"), 29 C.F.R. § 1915.1024, and 29 C.F.R. § 1926.1124.

WHEREAS, Petitioners filed petitions for review that were consolidated with other petitions for review of the final rule entitled "Occupational Exposure to Beryllium" in the United States Court of Appeals for the Eighth Circuit under Docket No. 17-1124.

WHEREAS, OSHA and Petitioners have diligently engaged in complex settlement discussions since filing the Petitions for Review;

NOW, THEREFORE, in light of the complexity of the issues raised by this matter and to avoid the expense and uncertainty of litigation, the parties have reached a mutually agreeable settlement of the litigation, and do hereby agree to the following terms:

- 1. Holding Petitions for Review in Abeyance. OSHA and Petitioners agree to file a joint motion with the Court of Appeals to hold the Petitions for Review in abeyance pending completion of the rulemakings in paragraphs 3 and 4 below within seven (7) days of the execution of this Agreement. OSHA agrees to post this settlement agreement and the related Appendices in the docket.
- Notice of Proposed Rulemaking to Extend Compliance Deadlines. (a) OSHA agrees to prepare and publish in the Federal Register a notice of proposed rulemaking ("First NPRM") that proposes to extend the Beryllium Standard's initial compliance date, 29 C.F.R. § 1910.1024(o)(2), from March 12, 2018, to December 12, 2018, for paragraphs (e), (f) except for the engineering controls provision with a compliance date of March 10, 2020, (h), (i) except for the change rooms and showers provisions with a compliance date of March 11, 2019, (j), (m), and (n).

(b) In the First NPRM, OSHA will explain that it is preparing an additional notice of proposed rulemaking ("Second NPRM") that will propose changes to many of the ancillary requirements of the Beryllium Standard and that it believes an extension of the initial compliance date is necessary to give OSHA sufficient time to prepare the Second NPRM. The First NPRM will not propose to change the compliance date in 29 C.F.R. § 1910.1024(o)(2)(i) for the change rooms and showers provisions in paragraph (i) of the Beryllium Standard or the compliance date in 29 C.F.R. § 1910.1024(o)(2)(ii) for the engineering controls required by paragraph (f) of the Beryllium Standard. OSHA will state in the First NPRM that until the Second NPRM is published, however, employers may comply with the medical surveillance provisions as clarified by the definitions of "CBD diagnostic center," "chronic beryllium disease," and "confirmed positive" contained in Appendix B that will be proposed in the Second NPRM. OSHA will provide compliance assistance to employers for paragraphs (k) and (l) of the Beryllium Standard and consider compliance with paragraphs (k) and (l) of the Beryllium Standard and consider compliance with paragraphs (k) and (l) of the Beryllium Standard as described to be modified by Appendix B to be a good-faith effort to comply with those provisions.

(c) OSHA will use its best efforts to publish the First NPRM as soon as possible after the execution of this agreement. OSHA will further use its best efforts to publish its final decision concerning the first rulemaking ("First Final Rule") as soon as possible after the comment period closes. Should OSHA not be able to issue its final decision before May 11, 2018, it will issue an enforcement policy delaying the compliance date of paragraphs (e), (f) except for the engineering controls provision with a compliance date of March 10, 2020, (h), (i) except for the change rooms and showers provisions with a compliance date of March 11, 2019, (j), (m), and (n) for a period of forty-five (45) days to allow OSHA to issue its final decision in the first

rulemaking before the enforcement policy expires. If that time period proves insufficient, OSHA will extend the enforcement policy until the final decision is made.

3. Direct Final Rule. (a) OSHA agrees to prepare and publish in the Federal Register a Direct Final Rule to revise the Beryllium Standard (DFR) along with a concurrent Notice of Proposed Rulemaking (DFR NPRM). The revisions to the Beryllium Standard in the DFR will be identical to those identified in Appendix A. OSHA will not include additional revisions to the Beryllium Standard in this DFR or DFR NPRM unless Petitioners review and agree to the changes prior to their publication in the Federal Register.

(b) OSHA agrees to include a statement in the DFR NPRM that it has preliminarily determined that the Beryllium Standard as modified by the proposed rule provides equal protection to the Beryllium Standard as promulgated, and that OSHA will consider compliance with the Beryllium Standard as modified by the proposed rule to be a *de minimis* violation and would result in no citation, no abatement, and no penalty while the rulemaking is pending.

(c) OSHA intends to publish the DFR and DFR NPRM prior to May 11, 2018. If OSHA is unable to publish the DFR and DFR NPRM before that date, it will announce an enforcement policy stating that it has preliminarily determined that the Beryllium Standard as modified by the regulatory text in Appendix A provides equal protection to the Beryllium Standard as promulgated, and that until the DFR and DFR NPRM is published, compliance with the Beryllium Standard as modified by Appendix A would be a *de minimis* violation and would result in no citation, no abatement, and no penalty.

(d) If OSHA receives significant adverse comment in response to the DFR or DFR NPRM, OSHA will provide the public with the opportunity to respond to such comment before publishing any final rule that does not adopt all material revisions set forth in Appendix A.

(e) For the purposes of the DFR, the term "significant adverse comment" means a comment that explains why the amendments being made to the beryllium standard would be inappropriate. In determining whether a comment necessitates withdrawal of the DFR, OSHA will consider whether the comment raises an issue serious enough to warrant a substantive response in a notice-and-comment process. OSHA will not consider a comment recommending an additional amendment to be a significant adverse comment unless the comment states why the DFR would be ineffective without the addition.

4. Second Notice of Proposed Rulemaking. (a) OSHA agrees to prepare and publish in the Federal Register a second notice of proposed rulemaking to revise the Beryllium Standard ("Second NPRM"). The proposed revisions to the Beryllium Standard will be identical to those identified in Appendix B. OSHA will not propose additional revisions to the Beryllium Standard in this Second NPRM unless Petitioners review and agree in writing to the suggested changes prior to their publication in the Federal Register.

(b) OSHA will use its best efforts to publish the Second NPRM as soon as possible after the publication of either the notice withdrawing the DFR NPRM or the final rule resulting from the DFR NPRM. If OSHA finalizes the First NPRM as proposed, and OSHA is unable to issue the Second NPRM before the Beryllium Standard's December 12, 2018 compliance date as

established by the First Final Rule, it will announce an enforcement policy stating that it has preliminarily determined that the Beryllium Standard as modified by the regulatory text in Appendix B provides equal protection to the Beryllium Standard as promulgated, and that until the Second NPRM is published, compliance with the Beryllium Standard as modified by Appendix B would be a *de minimis* violation and would result in no citation, no abatement, and no penalty.

(c) OSHA will state in the Second NPRM's preamble that compliance with the Beryllium Standard as modified by the regulatory text of the Second NPRM will be accepted as compliance with the Beryllium Standard until the rulemaking is complete. OSHA also will use its best efforts to complete the second rulemaking process and publish a final rule ("Second Final Rule") as soon as possible after the comment period following the Second NPRM closes.

(d) Petitioners agree to file a motion to dismiss their petitions for review with prejudice within 65 days of the publication in the Federal Register of a final rule resulting from the Second NPRM, regardless of the content of that final rule.

- 5. Existing Legal Obligations. The parties acknowledge that OSHA must comply with all legal obligations under the Occupational Safety and Health Act, the Administrative Procedure Act, and all other applicable law in making its final decision in all rulemakings covered by this agreement.
- 6. **Guidance Documents.** (a) OSHA agrees to include the language specified in Appendix C ("Guidance Documents") in guidance documents issued by the Agency to explain the Beryllium rule.

(b) After issuance of the Guidance Documents, OSHA shall not amend, modify, rescind, or change any language specified in Appendix C within seven years of the execution of this agreement except pursuant to the following procedure:

- (1) OSHA shall notify Petitioners in writing at least forty-five (45) days before OSHA adopts any contemplated change; and
- (2) OSHA shall meet with Petitioners upon request to discuss the contemplated changes before any changes are adopted.

(c) If OSHA adopts the amendments to 29 C.F.R. § 1910.1024(i)(4)(ii) and (j)(3) proposed in the Second NPRM relating to personal protective clothing and equipment in eating and drinking areas and disposal and recycling, OSHA will update its FAQ discussing the meaning of "as free as practicable" to reflect these revisions.

7. Effect of Agreement. (a) Notwithstanding anything in this Agreement to the contrary, nothing in this Agreement constitutes an admission of law or fact by any of the parties hereto for purposes of this litigation or in any other legal proceeding. By entering into this Agreement, the parties do not concede the validity or invalidity of any claim or argument that any party could have raised in this litigation. Nothing in this Agreement constitutes an admission by Petitioners that a significant risk of material impairment of health or functional capacity exists

in every industry due to exposures to beryllium at or below the 8-hour TWA permissible exposure limit published on January 9, 2017, or that any provision of the Beryllium Standard as published on January 9, 2017, is feasible in every industry.

(b) The dismissal with prejudice of the Petitions for Review pursuant to this agreement does not operate as a waiver by Petitioners:

(1) With respect to any citation for violation of the Beryllium Standard; or

(2) Of any claim under Section 6(f) of the OSH Act, 29 U.S.C. § 655(f), with respect to the final rule resulting from the DFR NPRM, if OSHA receives significant adverse comment on the DFR, or with respect to the final rule resulting from the second NPRM.

(c) If the DFR described in paragraph 3 goes into effect, Petitioners waive any claim under Section 6(f) of the OSH Act, 29 U.S.C. § 655(f), with respect to the DFR.

- 8. Scope and Amendment of Agreement. Appendices A, B, and C are incorporated by reference in this Agreement, which contains the full and complete agreement between OSHA and Petitioners with respect to the matters covered herein. Any prior conversations, meetings, discussions, drafts, and writings of any kind with respect to the matters covered herein are specifically superseded by this Agreement. No modification of this Agreement shall be effective unless it is in writing and signed by OSHA and Petitioners.
- Attorney's Fees. Each party agrees to bear its own attorneys' fees, costs, and other expenses that have been incurred in connection with the filing of the Petitions for Review and the negotiation of this Agreement.
- 10. **Execution.** (a) This Agreement is effective upon completion of the signing of the Agreement by OSHA and Petitioners. Each person who signs this Agreement in a representative capacity warrants that he or she is duly authorized to do so.

(b) This Agreement may be executed in any number of counterparts, each of which when executed shall be deemed an original. All counterparts together shall constitute a single original agreement.

IN WITNESS WHEREOF, OSHA and Petitioners have executed the foregoing Settlement Agreement or counterparts thereof, intending to be legally bound.

Agreed to this 241 day of April 2018.

Petitioners undi.

Materion Brush Inc. David G. Sarvadi Keller and Heckman LLP 1001 G Street, N.W. Suite 500 West Washington, D.C. 20001 (202) 434-4301

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AirBorn Inc.// David G. Sarvadi Keller and Heckman LLP 1001 G Street, N.W. Suite 500 West Washington, D.C. 20001 (202) 434-4301

and.

Mead Metals Inc. David G. Sarvadi Keller and Heckman LLP 1001 G Street, N.W. Suite 500 West Washington, D.C. 20001 (202) 434-4301

National Ass'n of Manufacturers David G. Sarvadi Keller and Heckman LLP 1001 G Street, N.W. Suite 500 West Washington, D.C. 20001 (202) 434-4301 Respondents

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Radha Vishnuvajjala Attorney U.S. Department of Labor 200 Constitution Ave., NW, S-4004 Washington, D.C. 20210 (202) 693-5790

Counsel for DoL and OSHA

Appendix A



§1910.1024 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 paragraphs (a)(2) and (a)(3) of this standard.

(2) This standard does not apply to articles, as defined in the Hazard Communication standard (HCS) (29 CFR 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.

(b) Definitions. As used in this standard:

Action level means a concentration of airborne beryllium of 0.1 micrograms per cubic meter of air $(\mu g/m3)$ calculated as an 8-hour time-weighted average (TWA).

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

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

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: (1) containing a process or operation that can release beryllium and that involves materials that contain at least 0.1 percent beryllium by weight; and (2) 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. 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.

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

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

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 <u>occurrence such as, but not limited to, equipment failure, rupture of</u> <u>containers, or failure of control equipment, which may or does result in an</u> uncontrolled <u>and</u> <u>unintended</u> release of airborne beryllium <u>that presents a significant hazard</u>.

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 paragraph (k) of this standard.

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

This standard means this beryllium standard, 29 CFR 1910.1024.

(c) Permissible Exposure Limits (PELs)—(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 μ g/m³ 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 μ g/m³ 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 paragraph (d)(2) or the scheduled monitoring option in paragraph (d)(3) of this standard.

(2) Performance option. The employer must assess the 8-hour TWA exposure and the 15-minute shortterm 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. (i) 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.

(ii) 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.

(iii) 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 paragraph (d)(3). In representative sampling, the employer must sample the employee(s) expected to have the highest airborne exposure to beryllium.

(iv) 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.

(v) 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.

(vi) 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.

(vii) 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 paragraph (d)(4) of this standard.

(viii) 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 paragraph (d)(4) of this standard.

(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 paragraph (d) of this standard 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. (i) Within 15 working days after completing an exposure assessment in accordance with paragraph (d) of this standard, 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.

(ii) 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. (i) 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).

(ii) 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.

(iii) The employer must ensure that each observer follows all other applicable safety and health procedures.

(e) Beryllium work areas and regulated areas—(1) Establishment. (i) The employer must establish and maintain a beryllium work area wherever the criteria for a "beryllium work area" set forth in paragraph (b) of this standard are met.

(ii) 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. (i) 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.

(ii) The employer must identify each regulated area in accordance with paragraph (m)(2) of this standard.

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

(i) Persons the employer authorizes or requires to be in a regulated area to perform work duties;

(ii) Persons entering a regulated area as designated representatives of employees for the purpose of exercising the right to observe exposure monitoring procedures under paragraph (d)(7) of this standard; and

(iii) 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:

(i) Respiratory protection in accordance with paragraph (g) of this standard; and

(ii) Personal protective clothing and equipment in accordance with paragraph (h) of this standard.

(f) Methods of compliance—(1) Written exposure control plan. (i) The employer must establish, implement, and maintain a written exposure control plan, which must contain:

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

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

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

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

(E) Procedures for keeping surfaces as free as practicable of beryllium;

(F) Procedures for minimizing the migration of beryllium from beryllium work areas to other locations within or outside the workplace;

(G) A list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) of this standard;

(H) A list of personal protective clothing and equipment required by paragraph (h) of this standard; and

(I) Procedures for removing, laundering, storing, cleaning, repairing, and disposing of berylliumcontaminated personal protective clothing and equipment, including respirators.

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

(A) Any change in production processes, materials, equipment, personnel, work practices, or control methods results, or can reasonably be expected to result, in new or additional airborne exposure to beryllium;

(B) The employer is notified that an employee is eligible for medical removal in accordance with paragraph (I)(1) of this standard, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to or dermal contact with beryllium; or

(C) The employer has any reason to believe that new or additional airborne exposure is occurring or will occur.

(iii) 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 OSHA's Access to Employee Exposure and Medical Records (Records Access) standard (§ 1910.1020(e)).

(2) Engineering and work practice controls.

(i) <u>The employer must use engineering and work practice controls to reduce and maintain employee</u> <u>airborne exposure to beryllium to or below the PEL and STEL, unless the employer can demonstrate that</u> <u>such controls are not feasible. Wherever the employer demonstrates that it is not feasible to reduce</u> <u>airborne exposure to or below the PELs with engineering and work practice controls, the employer must</u> <u>implement and maintain engineering and work practice controls to reduce airborne exposure to the</u> <u>lowest levels feasible and supplement these controls by using respiratory protection in accordance with</u> <u>paragraph (g) of this standard.</u> (ij) 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:

(A) Material and/or process substitution;

(B) Isolation, such as ventilated partial or full enclosures;

(C) Local exhaust ventilation, such as at the points of operation, material handling, and transfer; or

(D) Process control, such as wet methods and automation.

(<u>i</u>ii) An employer is exempt from using the controls listed in paragraph (f)(2)(i<u>i</u>) of this standard to the extent that:

(A) The employer can establish that such controls are not feasible; or

(B) 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.

-(iii) If airborne exposure exceeds the TWA PEL or STEL after implementing the control(s) required by (f)(2)(i), the employer must implement additional or enhanced engineering and work practice controls to reduce airborne exposure to or below the exposure limit(s) exceeded.

-(iv) 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 paragraphs (f)(2)(i) and (f)(2)(iii), 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 paragraph (g) of this standard.

(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:

(i) During periods necessary to install or implement feasible engineering and work practice controls where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;

(ii) During operations, including maintenance and repair activities and non-routine tasks, when engineering and work practice controls are not feasible and airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;

(iii) During operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL;

(iv) During emergencies; and

(v) When an employee who is eligible for medical removal under paragraph (I)(1) chooses to remain in a job with airborne exposure at or above the action level, as permitted by paragraph (I)(2)(ii) of this standard.

(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 the Respiratory Protection standard (§ 1910.134).

(3) The employer must provide at no cost to the employee a powered air-purifying respirator (PAPR) instead of a negative pressure respirator when

(i) Respiratory protection is required by this standard;

(ii) An employee entitled to such respiratory protection requests a PAPR; and

(iii) The PAPR provides adequate protection to the employee in accordance with paragraph (g)(2) of this standard.

(h) Personal protective clothing and equipment—(1) Provision and use. 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 paragraph (f)(1) of this standard and OSHA's Personal Protective Equipment standards (subpart I of this part):

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

(ii) Where there is a reasonable expectation of dermal contact with beryllium.

(2) Removal and storage. (i) 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.

(ii) 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 paragraph (f)(1) of this standard.

(iii) 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 paragraph (f)(1) of this standard.

(iv) 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.

(v) 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 paragraph (m)(3) of this standard and the HCS (§ 1910.1200).

(3) Cleaning and replacement. (i) 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.

(ii) The employer must ensure that beryllium is not removed from <u>beryllium-contaminated</u> personal protective clothing and equipment by blowing, shaking, or any other means that disperses beryllium into the air.

(iii) 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:

(i) Provide readily accessible washing facilities in accordance with this standard and the Sanitation standard (§ 1910.141) to remove beryllium from the hands, face, and neck; and

(ii) Ensure that employees who have dermal contact with beryllium wash any exposed skin at the end of the activity, process, or work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.

(2) Change rooms. In addition to the requirements of paragraph (i)(1)(i) of this standard, the employer must provide employees who work in a beryllium work area with a designated change room in accordance with this standard and the Sanitation standard (§ 1910.141) where employees are required to remove their personal clothing.

(3) Showers. (i) The employer must provide showers in accordance with the Sanitation standard (§ 1910.141) where:

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

(B) Beryllium can reasonably be expected to contaminate e<u>E</u>mployees' hair or body parts other than hands, face, and neck <u>can reasonably be expected to become contaminated with beryllium</u>.

(ii) Employers required to provide showers under paragraph (i)(3)(i) of this standard must ensure that each employee showers at the end of the work shift or work activity if:

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

(B) Beryllium could reasonably have contaminated tThe employee's hair or body parts other than hands, face, and neck could reasonably have become contaminated with beryllium.

(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:

(i) <u>Beryllium-contaminated S</u>urfaces in eating and drinking areas are as free as practicable of beryllium;

(ii) No employees enter any eating or drinking area with <u>beryllium-contaminated</u> 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

(iii) Eating and drinking facilities provided by the employer are in accordance with the Sanitation standard (§ 1910.141).

(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. (i) The employer must maintain all surfaces in beryllium work areas <u>and</u> <u>regulated areas</u> as free as practicable of beryllium and in accordance with the written exposure control plan required under paragraph (f)(1) and the cleaning methods required under paragraph (j)(2) of this standard; and

(ii) 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 paragraph (f)(1) and the cleaning methods required under paragraph (j)(2) of this standard.

(2) Cleaning methods. (i) The employer must ensure that surfaces in beryllium work areas and regulated areas are cleaned by HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure.

(ii) The employer must not allow dry sweeping or brushing for cleaning surfaces in beryllium work areas <u>or regulated areas</u> unless HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure are not safe or effective.

(iii) 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.

(iv) Where employees use dry sweeping, brushing, or compressed air to clean berylliumcontaminated surfaces, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with paragraphs (g) and (h) of this standard.

(v) 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 and recycling. For materials that contain beryllium in concentrations of 0.1 percent by weight or more or are contaminated with beryllium, tThe employer must ensure that:

(i) 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 paragraph (m)(3) of this standard; and

(ii) 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 paragraph (m)(3) of this standard, or placed in sealed, impermeable enclosures, such as bags or containers, that are labeled in accordance with paragraph (m)(3) of this standard.

(k) Medical surveillance—(1) General. (i) 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:

(A) Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;

(B) Who shows signs or symptoms of CBD or other beryllium-related health effects;

(C) Who is exposed to beryllium during an emergency; or

(D) Whose most recent written medical opinion required by paragraph (k)(6) or (k)(7) of this standard recommends periodic medical surveillance.

(ii) 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:

(i) Within 30 days after determining that:

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

(B) An employee meets the criteria of paragraph (k)(1)(i)(B) or (C).

(ii) At least every two years thereafter for each employee who continues to meet the criteria of paragraph (k)(1)(i)(A), (B), or (D) of this standard.

(iii) At the termination of employment for each employee who meets any of the criteria of paragraph (k)(1)(i) of this standard at the time the employee's employment terminates, unless an examination has been provided in accordance with this standard during the six months prior to the date of termination.

(3) Contents of examination. (i) 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.

(ii) The employer must ensure that the employee is offered a medical examination that includes:

(A) A medical and work history, with emphasis on past and present airborne exposure to or dermal contact with beryllium, smoking history, and any history of respiratory system dysfunction;

(B) A physical examination with emphasis on the respiratory system;

(C) A physical examination for skin rashes;

(D) Pulmonary function tests, performed in accordance with the guidelines established by the American Thoracic Society including forced vital capacity (FVC) and forced expiratory volume in one second (FEV1);

(E) A standardized BeLPT or equivalent test, upon the first examination and at least every two years thereafter, unless the employee is confirmed positive. If the results of the BeLPT are other than normal, a follow-up BeLPT must be offered within 30 days, unless the employee has been confirmed positive. Samples must be analyzed in a laboratory certified under the College of American Pathologists/Clinical Laboratory Improvement Amendments (CLIA) guidelines to perform the BeLPT.

(F) A low dose computed tomography (LDCT) scan, when recommended by the PLHCP after considering the employee's history of exposure to beryllium along with other risk factors, such as smoking history, family medical history, sex, age, and presence of existing lung disease; and

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

(4) Information provided to the PLHCP. The employer must ensure that the examining PLHCP (and the agreed-upon CBD diagnostic center, if an evaluation is required under paragraph (k)(7) of this standard) has a copy of this standard and must provide the following information, if known:

(i) A description of the employee's former and current duties that relate to the employee's airborne exposure to and dermal contact with beryllium;

(ii) The employee's former and current levels of airborne exposure;

(iii) A description of any personal protective clothing and equipment, including respirators, used by the employee, including when and for how long the employee has used that personal protective clothing and equipment; and

(iv) Information from records of employment-related medical examinations previously provided to the employee, currently within 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 paragraph (k)(3)(ii)(E) of this standard) and that the PLHCP explains the results of the examination to the employee. The written medical report must contain:

(i) A statement indicating the results of the medical examination, including the licensed physician's opinion as to whether the employee has

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

(B) Any medical conditions related to airborne exposure that require further evaluation or treatment.

(ii) Any recommendations on:

(A) The employee's use of respirators, protective clothing, or equipment; or

(B) Limitations on the employee's airborne exposure to beryllium.

(iii) If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, the written report must also contain a referral for an evaluation at a CBD diagnostic center.

(iv) If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for continued periodic medical surveillance.

(v) If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph (I) of this standard.

(6) Licensed physician's written medical opinion for the employer. (i) 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 paragraph (k)(3)(ii)(E) of this standard). The written medical opinion must contain only the following:

(A) The date of the examination;

(B) A statement that the examination has met the requirements of this standard;

(C) Any recommended limitations on the employee's use of respirators, protective clothing, or equipment; and

(D) A statement that the PLHCP has explained the results of the medical examination to the employee, including any tests conducted, any medical conditions related to airborne exposure that require further evaluation or treatment, and any special provisions for use of personal protective clothing or equipment;

(ii) If the employee provides written authorization, the written opinion must also contain any recommended limitations on the employee's airborne exposure to beryllium.

(iii) If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, and the employee provides written authorization, the written opinion must also contain a referral for an evaluation at a CBD diagnostic center.

(iv) If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for continued periodic medical surveillance.

(v) If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph (I) of this standard.

(vi) The employer must ensure that each employee receives a copy of the written medical opinion described in paragraph (k)(6) of this standard within 45 days of any medical examination (including any follow-up BeLPT required under paragraph (k)(3)(ii)(E) of this standard) performed for that employee.

(7) CBD diagnostic center. (i) 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:

(A) The employer's receipt of a physician's written medical opinion to the employer that recommends referral to a CBD diagnostic center; or

(B) 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.

(ii) The employer must ensure that the employee receives a written medical report from the CBD diagnostic center that contains all the information required in paragraph (k)(5)(i), (ii), (iv), and (v) of this standard and that the PLHCP explains the results of the examination to the employee within 30 days of the examination.

(iii) 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 paragraph (k)(6)(i), as applicable, unless the employee provides written authorization to release additional information. If the employee provides written authorization, the written opinion must also contain the information from paragraphs (k)(6)(ii), (iv), and (v), if applicable.

(iv) The employer must ensure that each employee receives a copy of the written medical opinion from the CBD diagnostic center described in paragraph (k)(7) of this standard within 30 days of any medical examination performed for that employee.

(v) After an employee has received the initial clinical evaluation at a CBD diagnostic center described in paragraph (k)(7)(i) of this standard, the employee may choose to have any subsequent medical examinations for which the employee is eligible under paragraph (k) of this standard performed at a CBD diagnostic center mutually agreed upon by 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:

(i) The employee provides the employer with:

(A) A written medical report indicating a confirmed positive finding or CBD diagnosis; or

(B) A written medical report recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(5)(v) or (k)(7)(ii) of this standard; or

(ii) The employer receives a written medical opinion recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(6)(v) or (k)(7)(iii) of this standard.

(2) If an employee is eligible for medical removal, the employer must provide the employee with the employee's choice of:

(i) Removal as described in paragraph (I)(3) of this standard; or

(ii) 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 paragraph (g) of this standard whenever airborne exposures are at or above the action level.

(3) If the employee chooses removal:

(i) If a comparable job is available where airborne exposures to beryllium are below the action level, and the employee is qualified for that job or can be trained within one month, 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.

(ii) 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 paragraph (I)(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.

(m) Communication of hazards—(1) General. (i) Chemical manufacturers, importers, distributors, and employers must comply with all requirements of the HCS (§ 1910.1200) for beryllium.

(ii) In classifying the hazards of beryllium, at least the following hazards must be addressed: Cancer; lung effects (CBD and acute beryllium disease); beryllium sensitization; skin sensitization; and skin, eye, and respiratory tract irritation.

(iii) 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 the HCS (§ 1910.1200) and paragraph (m)(4) of this standard.

(2) Warning signs. (i) 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.

(ii) Sign specification. (A) The employer must ensure that the warning signs required by paragraph (m)(2)(i) of this standard are legible and readily visible.

(B) The employer must ensure each warning sign required by paragraph (m)(2)(i) of this standard 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 the HCS (§ 1910.1200), 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. (i) For each employee who has, or can reasonably be expected to have, airborne exposure to or dermal contact with beryllium:

(A) The employer must provide information and training in accordance with the HCS (§ 1910.1200(h));

(B) The employer must provide initial training to each employee by the time of initial assignment; and

(C) The employer must repeat the training required under this standard annually for each employee.

(ii) 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:

(A) The health hazards associated with airborne exposure to and contact with beryllium, including the signs and symptoms of CBD;

(B) The written exposure control plan, with emphasis on the location(s) of beryllium work areas, 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;

(C) The purpose, proper selection, fitting, proper use, and limitations of personal protective clothing and equipment, including respirators;

(D) Applicable emergency procedures;

(E) Measures employees can take to protect themselves from airborne exposure to and contact with beryllium, including personal hygiene practices;

(F) The purpose and a description of the medical surveillance program required by paragraph (k) of this standard including risks and benefits of each test to be offered;

(G) The purpose and a description of the medical removal protection provided under paragraph (I) of this standard;

(H) The contents of the standard; and

(I) The employee's right of access to records under the Records Access standard (§ 1910.1020).

(iii) When a workplace change (such as modification of equipment, tasks, or procedures) results in new or increased airborne exposure that exceeds, or can reasonably be expected to exceed, either the TWA PEL or the STEL, the employer must provide additional training to those employees affected by the change in airborne exposure.

(iv) 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. (i) The employer must make and maintain a record of all exposure measurements taken to assess airborne exposure as prescribed in paragraph (d) of this standard.

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

(A) The date of measurement for each sample taken;

(B) The task that is being monitored;

(C) The sampling and analytical methods used and evidence of their accuracy;

(D) The number, duration, and results of samples taken;

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

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

(iii) The employer must ensure that exposure records are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

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

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

(A) The data relied upon;

(B) The beryllium-containing material in question;

(C) The source of the objective data;

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

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

(iii) The employer must ensure that objective data are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

(3) Medical surveillance. (i) The employer must make and maintain a record for each employee covered by medical surveillance under paragraph (k) of this standard.

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

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

(B) A copy of all licensed physicians' written medical opinions for each employee; and

(C) A copy of the information provided to the PLHCP as required by paragraph (k)(4) of this standard.

(iii) The employer must ensure that medical records are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

(4) Training. (i) At the completion of any training required by 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.

(ii) 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 Assistant Secretary, the Director, each employee, and each employee's designated representative(s) in accordance the Records Access standard (§ 1910.1020).

(6) Transfer of records. The employer must comply with the requirements involving transfer of records set forth in the Records Access standard (§ 1910.1020).

(o) Dates—(1) Effective date. This standard shall become effective March 10, 2017.

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

(i) Change rooms and showers required by paragraph (i) of this standard must be provided by March 11, 2019; and

(ii) Engineering controls required by paragraph (f) of this standard must be implemented by March 10, 2020.

(p) 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 (Non-Mandatory)

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.

| 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 |
| extruding) | 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. | Composites |

Table A.1: Exposure Control Recommendations

| Chemical Processing Operations (e.g., leaching, pickling, degreasing, etching, plating) Finishing (e.g., | 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. (1) Perform portable finishing operations in a ventilated | Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Copper Rolling, Drawing and Extruding Secondary Smelting; |
|---|--|--|
| grinding, sanding, polishing, deburring) | 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. | Fabrication of Beryllium Alloy Products; Dental Labs |
| Furnace Operations (e.g., Melting and Casting) | (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. (2) Use mechanical ventilation (make-up air) in furnace building. | Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Nonferrous Foundries; Secondary Smelting |
| Machining | 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); (2) high velocity low volume hoods or ventilated enclosures on lathes, vertical mills, CNC mills, and tool grinding operations; (3) for beryllium oxide ceramics, LEV on lapping, dicing, and laser cutting; and | Primary Beryllium Production; Beryllium Oxide Ceramics and Composites; Copper Rolling, Drawing, and Extruding; Precision Turned Products |

| | (1) wet mothodo (a, a) and (a, b) | |
|--|--|---|
| | (4) wet methous (e.g., coolants). | |
| Mechanical Processing | (1) Enclose and ventilate sources of emission; | Primary Beryllium |
| (e.g., material handling (including | (2) Prohibit open handling of materials; and | Production; Beryllium Oxide Ceramics and |
| scrap), sorting, | (3) Use mechanical ventilation (make-up air) in processing | Composites; Aluminum |
| crushing, screening, | areas. | and Copper Foundries; |
| pulverizing, shredding, | | Secondary Smelting |
| pouring, mixing, | | |
| blending) | | |
| Metal Forming (e.g., | (1) For rolling operations, install LEV on mill stands and | Primary Beryllium |
| rolling, drawing, | reels such that a hood extends the length of the mill; | Production; Copper |
| straightening, | | Rolling, Drawing, and |
| annealing, extruding) | (2) For point and chamfer operations, install LEV hoods at | Extruding; Fabrication of |
| | both ends of the rod; | Beryllium Alloy Products |
| | (3) 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; | |
| | (5) For drawing, straightening, and extruding operations, | |
| | instan Lev at entry and exit points; and | |
| | (6) For all metal forming operations, install mechanical | |
| | ventilation (make-up air) for processing areas. | |
| | | |

| Welding | For fixed welding operations: | Primary Beryllium |
|---------|---|--|
| | (1) Enclose work locations around the source of fume generation and use local exhaust ventilation; and | Production; Fabrication of Beryllium Alloy Products; Welding |
| | (2) 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. | |

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

Appendix B

DS



§1910.1024 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 paragraphs (a)(2) and (a)(3) of this standard.

(2) This standard does not apply to articles, as defined in the Hazard Communication standard (HCS) (29 CFR 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.

(b) Definitions. As used in this standard:

Action level means a concentration of airborne beryllium of 0.1 micrograms per cubic meter of air $(\mu g/m3)$ calculated as an 8-hour time-weighted average (TWA).

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

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

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

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

Beryllium work area means any work area: (1) containing a process or operation that can release beryllium and that involves where materials that contain at least 0.1 percent beryllium by weight; and are processed either: (1) during any of the operations listed in Appendix A of this Standard; or (2) where employees are, or can reasonably be expected to be, exposed to airborne beryllium at anyor above the action level or where there is the potential for dermal contact with beryllium.

CBD diagnostic center means a medical diagnostic center that has <u>an on-sitea pulmonologist or</u> pulmonary specialist<u>on staff</u> and on-site facilities to perform a clinical evaluation for the presence of chronic beryllium disease (CBD). <u>This evaluation must include The CBD diagnostic center must have the capacity to perform</u> 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 <u>on-sitepulmonologist or</u> pulmonary specialist must be able to interpret the biopsy pathology and the BAL diagnostic test results.

Chronic beryllium disease (CBD) means a chronic <u>granulomatous</u> lung disease <u>associated withcaused by</u> <u>inhalation of</u> airborne <u>exposure to</u> beryllium<u>by an individual who is beryllium-sensitized</u>.

Confirmed positive means the person tested has beryllium sensitization, as indicated byhad two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test resultsobtained within the 30 day follow-up test period required after a first abnormal or borderline BeLPT test result. It also means the result of a more reliable and accurate test indicating a person has been identified as having beryllium sensitization.

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

Dermal contact with beryllium means skin exposure to: (1) soluble beryllium compounds containing beryllium in concentrations greater than or equal to 0.1 percent by weight; (2) solutions containing beryllium in concentrations greater than or equal to 0.1 percent by weight; or (3) <u>visible</u> dust, fumes, or mists containing beryllium in concentrations greater than or equal to 0.1 percent by weight. <u>The handling of beryllium materials in non-particulate solid form that are free from visible dust containing beryllium in concentrations greater than or equal to 0.1 percent by weight is not considered dermal <u>contact under the standard.</u></u>

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

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

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

Objective data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating airborne exposure to beryllium associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher airborne exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows the individual to

independently provide or be delegated the responsibility to provide some or all of the health care services required by paragraph (k) of this standard.

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

This standard means this beryllium standard, 29 CFR 1910.1024.

(c) Permissible Exposure Limits (PELs)—(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 μ g/m³ 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 μ g/m³ 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 paragraph (d)(2) or the scheduled monitoring option in paragraph (d)(3) of this standard.

(2) Performance option. The employer must assess the 8-hour TWA exposure and the 15-minute shortterm 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. (i) 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.

(ii) 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.

(iii) 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 paragraph (d)(3). In representative sampling, the employer must sample the employee(s) expected to have the highest airborne exposure to beryllium.

(iv) 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.

(v) 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.

(vi) 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.

(vii) 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 paragraph (d)(4) of this standard.

(viii) 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 paragraph (d)(4) of this standard.

(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 paragraph (d) of this standard 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. (i) Within 15 working days after completing an exposure assessment in accordance with paragraph (d) of this standard, 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.

(ii) 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. (i) 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).

(ii) 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.

(iii) The employer must ensure that each observer follows all other applicable safety and health procedures.

(e) Beryllium work areas and regulated areas—(1) Establishment.
(i) The employer must establish and maintain a beryllium work area wherever the criteria for a "beryllium work area" set forth in paragraph
(b) of this standard are met.

(ii) 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. (i) 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.

(ii) The employer must identify each regulated area in accordance with paragraph (m)(2) of this standard.

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

(i) Persons the employer authorizes or requires to be in a regulated area to perform work duties;

(ii) Persons entering a regulated area as designated representatives of employees for the purpose of exercising the right to observe exposure monitoring procedures under paragraph (d)(7) of this standard; and

(iii) 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:

(i) Respiratory protection in accordance with paragraph (g) of this standard; and

(ii) Personal protective clothing and equipment in accordance with paragraph (h) of this standard.

(f) Methods of compliance—(1) Written exposure control plan. (i) The employer must establish, implement, and maintain a written exposure control plan, which must contain:

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

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

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

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

(E) Procedures for keeping surfaces as free as practicable of beryllium;

(F) Procedures for minimizing the migration of beryllium from beryllium work areas to other locations within or outside the workplace;

(G) A list of engineering controls, work practices, and respiratory protection required by paragraph (f)(2) of this standard;

(H) A list of personal protective clothing and equipment required by paragraph (h) of this standard; and

(I) Procedures for removing, laundering, storing, cleaning, repairing, and disposing of berylliumcontaminated personal protective clothing and equipment, including respirators.

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

(A) Any change in production processes, materials, equipment, personnel, work practices, or control methods results, or can reasonably be expected to result, in new or additional airborne exposure to beryllium;

(B) The employer is notified that an employee is eligible for medical removal in accordance with paragraph (I)(1) of this standard, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to or dermal contact with beryllium; or

(C) The employer has any reason to believe that new or additional airborne exposure is occurring or will occur.

(iii) 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 OSHA's Access to Employee Exposure and Medical Records (Records Access) standard (§ 1910.1020(e)).

(2) Engineering and work practice controls.

(i) The employer must use engineering and work practice controls to reduce and maintain employee airborne exposure to beryllium to or below the PEL and STEL, unless the employer can demonstrate that such controls are not feasible. Wherever the employer demonstrates that it is not feasible to reduce airborne exposure to or below the PELs with 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 paragraph (g) of this standard.

(ii) 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:

(A) Material and/or process substitution;

(B) Isolation, such as ventilated partial or full enclosures;

(C) Local exhaust ventilation, such as at the points of operation, material handling, and transfer; or

(D) Process control, such as wet methods and automation.

(iii) An employer is exempt from using the controls listed in paragraph (f)(2)(ii) of this standard to the extent that:

(A) The employer can establish that such controls are not feasible; or

(B) 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.

(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:

(i) During periods necessary to install or implement feasible engineering and work practice controls where airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;

(ii) During operations, including maintenance and repair activities and non-routine tasks, when engineering and work practice controls are not feasible and airborne exposure exceeds, or can reasonably be expected to exceed, the TWA PEL or STEL;

(iii) During operations for which an employer has implemented all feasible engineering and work practice controls when such controls are not sufficient to reduce airborne exposure to or below the TWA PEL or STEL;

(iv) During emergencies; and

(v) When an employee who is eligible for medical removal under paragraph (I)(1) chooses to remain in a job with airborne exposure at or above the action level, as permitted by paragraph (I)(2)(ii) of this standard.

(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 the Respiratory Protection standard (§ 1910.134).

(3) The employer must provide at no cost to the employee a powered air-purifying respirator (PAPR) instead of a negative pressure respirator when

(i) Respiratory protection is required by this standard;

(ii) An employee entitled to such respiratory protection requests a PAPR; and

(iii) The PAPR provides adequate protection to the employee in accordance with paragraph (g)(2) of this standard.

(h) Personal protective clothing and equipment—(1) Provision and use. 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 paragraph (f)(1) of this standard and OSHA's Personal Protective Equipment standards (subpart I of this part):

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

(ii) Where there is a reasonable expectation of dermal contact with beryllium.

(2) Removal and storage. (i) 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 <u>all</u> tasks involving beryllium, or when personal protective clothing or equipment becomes visibly contaminated with beryllium, whichever comes first.

(ii) 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 paragraph (f)(1) of this standard.

(iii) 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 paragraph (f)(1) of this standard.

(iv) 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.

(v) 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 paragraph (m)(3) of this standard and the HCS (§ 1910.1200).

(3) Cleaning and replacement. (i) 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.

(ii) The employer must ensure that beryllium is not removed from beryllium-contaminated personal protective clothing and equipment by blowing, shaking, or any other means that disperses beryllium into the air.

(iii) 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<u>or</u> who can reasonably be expected to have dermal contact with beryllium, the employer must:

(i) Provide readily accessible washing facilities in accordance with this standard and the Sanitation standard (§ 1910.141) to remove beryllium from the hands, face, and neck; and

(ii) Ensure that employees who have dermal contact with beryllium wash any exposed skin at the end of the activity, process, or work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.

(2) Change rooms. In addition to the requirements of paragraph (i)(1)(i) of this standard, the employer must provide employees who work in a beryllium work area are required to use personal protective clothing or equipment under paragraph (h)(1)(ii) of this standard with a designated change room in accordance with this standard and the Sanitation standard (§ 1910.141) where employees are required to remove their personal clothing.

(3) Showers. (i) The employer must provide showers in accordance with the Sanitation standard (§ 1910.141) where:

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

(B) Employees' hair or body parts other than hands, face, and neck can reasonably be expected to become contaminated with beryllium.

(ii) Employers required to provide showers under paragraph (i)(3)(i) of this standard must ensure that each employee showers at the end of the work shift or work activity if:

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

(B) The employee's hair or body parts other than hands, face, and neck could reasonably have become contaminated with beryllium.

(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:

(i) Beryllium-contaminated surfaces in eating and drinking areas are as free as practicable of beryllium;

(ii) No employees enter any eating or drinking area with beryllium-contaminated personal protective clothing or equipment unless, prior to entry, surfaceit is cleaned, as necessary, to be as free as practicable of 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

(iii) Eating and drinking facilities provided by the employer are in accordance with the Sanitation standard (§ 1910.141).

(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. (i) The employer must maintain all surfaces in beryllium work areas and regulated areas as free as practicable of beryllium and in accordance with the written exposure control plan required under paragraph (f)(1) and the cleaning methods required under paragraph (j)(2) of this standard; and

(ii) 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 paragraph (f)(1) and the cleaning methods required under paragraph (j)(2) of this standard.

(2) Cleaning methods. (i) The employer must ensure that surfaces in beryllium work areas and regulated areas are cleaned by HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure.

(ii) The employer must not allow dry sweeping or brushing for cleaning surfaces in beryllium work areas or regulated areas unless HEPA-filtered vacuuming or other methods that minimize the likelihood and level of airborne exposure are not safe or effective.

(iii) 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.

(iv) Where employees use dry sweeping, brushing, or compressed air to clean berylliumcontaminated surfaces, the employer must provide, and ensure that each employee uses, respiratory protection and personal protective clothing and equipment in accordance with paragraphs (g) and (h) of this standard.

(v) 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 and, recycling. For, and reuse.

- (i) <u>When the employer transfers</u> materials that contain <u>at least 0.1%</u> beryllium in <u>concentrations of 0.1 percent</u> by weight <u>or more</u> or are contaminated with beryllium <u>to</u> <u>another party for disposal, recycling, or reuse</u>, the employer must <u>ensure that: label the</u> <u>materials in accordance with paragraph (m)(3) of this standard;</u>
 (i) <u>Materials</u>
- (ii) Except for intra-plant transfers, materials designated for disposal that contain at least 0.1% beryllium by weight or are disposed of in sealed, impermeable contaminated with beryllium must be cleaned to be as free as practicable of beryllium or placed in enclosures that prevent the release of beryllium-containing particulate or solutions under normal conditions of use, storage, or transport, such as bags or containers, that are labeled in accordance with paragraph (m)(3) of this standard; and
- (iii) <u>MaterialsExcept for intra-plant transfers, materials</u> designated for recycling <u>or reuse</u> that contain at least 0.1% beryllium by weight or are <u>contaminated with beryllium must</u> <u>be</u> cleaned to be as free as practicable-of <u>surface beryllium</u> contamination and labeled in accordance with paragraph (m)(3) of this standard, <u>beryllium</u> or placed in <u>sealed</u>, <u>impermeable</u> enclosures that prevent the release of beryllium-containing particulate or <u>solutions under normal conditions of use</u>, storage, or transport, such as bags or containers, that are labeled in accordance with paragraph (m)(3).

(k) Medical surveillance—(1) General. (i) 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:

(A) Who is or is reasonably expected to be exposed at or above the action level for more than 30 days per year;

(B) Who shows signs or symptoms of CBD or other beryllium-related health effects;

(C) Who is exposed to beryllium during an emergency; or

(D) Whose most recent written medical opinion required by paragraph (k)(6) or (k)(7) of this standard recommends periodic medical surveillance.

(ii) 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:

(i) Within 30 days after determining that:

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

(B) An employee meets the criteria of paragraph (k)(1)(i)(B) or (C).

(ii) At least every two years thereafter for each employee who continues to meet the criteria of paragraph (k)(1)(i)(A), (B), or (D) of this standard.

(iii) At the termination of employment for each employee who meets any of the criteria of paragraph (k)(1)(i) of this standard at the time the employee's employment terminates, unless an examination has been provided in accordance with this standard during the six months prior to the date of termination.

(iv) At least one year but no more than two years after an employee meets the criteria of paragraph (k)(1)(i)(C).

(3) Contents of examination. (i) 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.

(ii) The employer must ensure that the employee is offered a medical examination that includes:

(A) A medical and work history, with emphasis on past and present airborne exposure to or dermal contact with beryllium, smoking history, and any history of respiratory system dysfunction;

(B) A physical examination with emphasis on the respiratory system;

(C) A physical examination for skin rashes;

(D) Pulmonary function tests, performed in accordance with the guidelines established by the American Thoracic Society including forced vital capacity (FVC) and forced expiratory volume in one second (FEV1);

(E) A standardized BeLPT or equivalent test, upon the first examination and at least every two years thereafter, unless the employee is confirmed positive. If the results of the BeLPT are other than normal, a follow-up BeLPT must be offered within 30 days, unless the employee has been confirmed positive. Samples must be analyzed in a laboratory certified under the College of American Pathologists/Clinical Laboratory Improvement Amendments (CLIA) guidelines to perform the BeLPT.

(F) A low dose computed tomography (LDCT) scan, when recommended by the PLHCP after considering the employee's history of exposure to beryllium along with other risk factors, such as smoking history, family medical history, sex, age, and presence of existing lung disease; and

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

(4) Information provided to the PLHCP. The employer must ensure that the examining PLHCP (and the agreed-upon CBD diagnostic center, if an evaluation is required under paragraph (k)(7) of this standard) has a copy of this standard and must provide the following information, if known:

(i) A description of the employee's former and current duties that relate to the employee's airborne exposure to and dermal contact with beryllium;

(ii) The employee's former and current levels of airborne exposure;

(iii) A description of any personal protective clothing and equipment, including respirators, used by the employee, including when and for how long the employee has used that personal protective clothing and equipment; and

(iv) Information from records of employment-related medical examinations previously provided to the employee, currently within 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 paragraph (k)(3)(ii)(E) of this standard) and that the PLHCP explains the results of the examination to the employee. The written medical report must contain:

(i) A statement indicating the results of the medical examination, including the licensed physician's opinion as to whether the employee has

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

(B) Any medical conditions related to airborne exposure that require further evaluation or treatment.

(ii) Any recommendations on:

(A) The employee's use of respirators, protective clothing, or equipment; or

(B) Limitations on the employee's airborne exposure to beryllium.

(iii) If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, the written report must also contain a referral for an evaluation at a CBD diagnostic center.

(iv) If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for continued periodic medical surveillance.

(v) If the employee is confirmed positive or diagnosed with CBD the written report must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph (I) of this standard.

(6) Licensed physician's written medical opinion for the employer. (i) 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 paragraph (k)(3)(ii)(E) of this standard). The written medical opinion must contain only the following:

(A) The date of the examination;

(B) A statement that the examination has met the requirements of this standard;

(C) Any recommended limitations on the employee's use of respirators, protective clothing, or equipment; and

(D) A statement that the PLHCP has explained the results of the medical examination to the employee, including any tests conducted, any medical conditions related to airborne exposure that require further evaluation or treatment, and any special provisions for use of personal protective clothing or equipment;

(ii) If the employee provides written authorization, the written opinion must also contain any recommended limitations on the employee's airborne exposure to beryllium.

(iii) If the employee is confirmed positive or diagnosed with CBD or if the licensed physician otherwise deems it appropriate, and the employee provides written authorization, the written opinion must also contain a referral for an evaluation at a CBD diagnostic center.

(iv) If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for continued periodic medical surveillance.

(v) If the employee is confirmed positive or diagnosed with CBD and the employee provides written authorization, the written opinion must also contain a recommendation for medical removal from airborne exposure to beryllium, as described in paragraph (I) of this standard.

(vi) The employer must ensure that each employee receives a copy of the written medical opinion described in paragraph (k)(6) of this standard within 45 days of any medical examination (including any follow-up BeLPT required under paragraph (k)(3)(ii)(E) of this standard) performed for that employee.

(7) CBD diagnostic center. (i) 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 The employer must also provide, at no cost to the employee and within a reasonable time after the initial consultation with the CBD diagnostic center, any of the following tests if deemed appropriate by the examining physician at the CBD diagnostic center: pulmonary function testing (as

outlined by the American Thoracic Society criteria), bronchoalveolar lavage (BAL), and transbronchial biopsy. The initial consultation with the CBD diagnostic center must be provided within 30 days of:

(A) The employer's receipt of a physician's written medical opinion to the employer that recommends referral to a CBD diagnostic center; or

(B) 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.

(ii) The employer must ensure that the employee receives a written medical report from the CBD diagnostic center that contains all the information required in paragraph (k)(5)(i), (ii), (iv), and (v) of this standard and that the PLHCP explains the results of the examination to the employee within 30 days of the examination.

(iii) 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 paragraph (k)(6)(i), as applicable, unless the employee provides written authorization to release additional information. If the employee provides written authorization, the written opinion must also contain the information from paragraphs (k)(6)(ii), (iv), and (v), if applicable.

(iv) The employer must ensure that each employee receives a copy of the written medical opinion from the CBD diagnostic center described in paragraph (k)(7) of this standard within 30 days of any medical examination performed for that employee.

(v) After an employee has received the initial clinical evaluation at a CBD diagnostic center described in paragraph (k)(7)(i) of this standard, the employee may choose to have any subsequent medical examinations for which the employee is eligible under paragraph (k) of this standard performed at a CBD diagnostic center mutually agreed upon by 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:

(i) The employee provides the employer with:

(A) A written medical report indicating a confirmed positive finding or CBD diagnosis; or

(B) A written medical report recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(5)(v) or (k)(7)(ii) of this standard; or

(ii) The employer receives a written medical opinion recommending removal from airborne exposure to beryllium in accordance with paragraph (k)(6)(v) or (k)(7)(iii) of this standard.

(2) If an employee is eligible for medical removal, the employer must provide the employee with the employee's choice of:

(i) Removal as described in paragraph (I)(3) of this standard; or

(ii) 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 paragraph (g) of this standard whenever airborne exposures are at or above the action level.

(3) If the employee chooses removal:

(i) If a comparable job is available where airborne exposures to beryllium are below the action level, and the employee is qualified for that job or can be trained within one month, 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.

(ii) 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 paragraph (I)(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.

(m) Communication of hazards—(1) General. (i) Chemical manufacturers, importers, distributors, and employers must comply with all requirements of the HCS (§ 1910.1200) for beryllium.

(ii) In classifying the hazards of beryllium, at least the following hazards must be addressed: Cancer; lung effects (CBD and acute beryllium disease); beryllium sensitization; skin sensitization; and skin, eye, and respiratory tract irritation.

(iii) 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 the HCS (§ 1910.1200) and paragraph (m)(4) of this standard.

(2) Warning signs. (i) 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.

(ii) Sign specification. (A) The employer must ensure that the warning signs required by paragraph (m)(2)(i) of this standard are legible and readily visible.

(B) The employer must ensure each warning sign required by paragraph (m)(2)(i) of this standard 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 the HCS (§ 1910.1200), the employer must label each bag and<u>immediate</u> 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. (i) For each employee who has, or can reasonably be expected to have, airborne exposure to or dermal contact with beryllium:

(A) The employer must provide information and training in accordance with the HCS (§ 1910.1200(h));

(B) The employer must provide initial training to each employee by the time of initial assignment; and

(C) The employer must repeat the training required under this standard annually for each employee.

(ii) 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:

(A) The health hazards associated with airborne exposure to and <u>dermal</u> contact with beryllium, including the signs and symptoms of CBD;

(B) The written exposure control plan, with emphasis on the location(s) of beryllium work areas, 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;

(C) The purpose, proper selection, fitting, proper use, and limitations of personal protective clothing and equipment, including respirators;

(D) Applicable emergency procedures;

(E) Measures employees can take to protect themselves from airborne exposure to and <u>dermal</u> contact with beryllium, including personal hygiene practices;

(F) The purpose and a description of the medical surveillance program required by paragraph (k) of this standard including risks and benefits of each test to be offered;

(G) The purpose and a description of the medical removal protection provided under paragraph (I) of this standard;

(H) The contents of the standard; and

(I) The employee's right of access to records under the Records Access standard (§ 1910.1020).

(iii) When a workplace change (such as modification of equipment, tasks, or procedures) results in new or increased airborne exposure that exceeds, or can reasonably be expected to exceed, either the TWA PEL or the STEL, the employer must provide additional training to those employees affected by the change in airborne exposure.

(iv) 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. (i) The employer must make and maintain a record of all exposure measurements taken to assess airborne exposure as prescribed in paragraph (d) of this standard.

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

(A) The date of measurement for each sample taken;

(B) The task that is being monitored;

(C) The sampling and analytical methods used and evidence of their accuracy;

(D) The number, duration, and results of samples taken;

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

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

(iii) The employer must ensure that exposure records are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

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

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

(A) The data relied upon;

(B) The beryllium-containing material in question;

(C) The source of the objective data;

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

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

(iii) The employer must ensure that objective data are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

(3) Medical surveillance. (i) The employer must make and maintain a record for each employee covered by medical surveillance under paragraph (k) of this standard.

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

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

(B) A copy of all licensed physicians' written medical opinions for each employee; and

(C) A copy of the information provided to the PLHCP as required by paragraph (k)(4) of this standard.

(iii) The employer must ensure that medical records are maintained and made available in accordance with the Records Access standard (§ 1910.1020).

(4) Training. (i) At the completion of any training required by 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.

(ii) 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 Assistant Secretary, the Director, each employee, and each employee's designated representative(s) in accordance the Records Access standard (§ 1910.1020).

(6) Transfer of records. The employer must comply with the requirements involving transfer of records set forth in the Records Access standard (§ 1910.1020).

(o) Dates—(1) Effective date. This standard shall become effective March 10, 2017.

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

(i) Change rooms and showers required by paragraph (i) of this standard must be provided by March 11, 2019; and

(ii) Engineering controls required by paragraph (f) of this standard must be implemented by March 10, 2020.

(p) Appendix. Appendix A – Control Strategies to Minimize Beryllium Exposure of this standard is nonmandatory.

Appendix A to § 1910.1024 -- Control Strategies to Minimize- Operations for Establishing Beryllium Exposure (Non-Mandatory)Work Areas

Paragraph (f)(2)(ib) of this standard requires employers to use one or more defines a beryllium work area as any work area where materials that contain at least 0.1 percent beryllium by weight are processed (1) during any of the control methods operations listed in paragraph (f)(2)(i)Appendix A of this Standard, or (2) where employees are, or can reasonably be expected to be, exposed to minimize worker exposure in each operation in a airborne beryllium work area, unless at or above the operation is exempt under paragraph (f)(2)(ii). This action level. Table A.1 in this appendix sets forth a non-exhaustive list of control options that employers could use to comply with paragraph (f)(2)(i) the operations that, where performed under the circumstances described in the column heading above the particular operations, trigger the requirement for a number of specific beryllium operations. work area.

Table A.1: Exposure Control Recommendations

[Remove Table A.1: Exposure Control Recommendations]

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

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

| Electrical Discharge Machining | Chemical Cleaning | Destructive Testing |
|---------------------------------------|-------------------------------|------------------------------------|
| <u>(EDM)</u> | Chemical Etching | Dicing |
| Extrusion | Chemical Milling | <u>Drilling</u> |
| Forging | CNC Machining | Dry/wet Tumbling |
| Grinding | Cold Isostatic Pressing | <u>Extrusion</u> |
| Heat Treating (in air) | Cold Pilger | Filing by Hand |
| High Speed Machining (>10,000 rpm) | <u>Crushing</u> | Firing of green ceramic |
| Hot Rolling | Cutting | Firing of refractory metallization |
| Lapping | Deburring | (> 1,100 ⁻ C) |
| Laser Cutting | Dicing | |
| Laser Machining | Drawing | Honing |
| Laser Scribing | Drilling | |
| Laser Marking | Dross Handling | Lapping |
| Melting | Electrical Chemical Machining | |
| Photo-Etching | (ECIVI) | |
| Pickling | (EDM) | |
| Point and Chamfer | Extrusion | Machining |
| Polishing | Filing by Hand | Milling |
| Torch Cutting (i.e., oxy- | Forging | Piercing |
| <u>acetylene)</u> | Grinding | Mixing |
| Tumbling | <u>Heading</u> | |
| | | |

| Water-jet Cutting | Heat Treating | <u>Plasma Spray</u> |
|-------------------|------------------------------|----------------------------|
| Welding | Honing | Polishing |
| Sanding | Hot Isostatic Pressing (HIP) | Powder Handling |
| Slab Milling | <u>Lapping</u> | Powder Pressing |
| | Laser Cutting | Reaming |
| | Laser Machining | Sanding |
| | Laser Scribing | Sectioning |
| | Laser Marking | <u>Shearing</u> |
| | Machining | Sintering of green ceramic |
| | Melting | Sintering of refractory |
| | Milling | metallization (>1,100° C) |
| | Mixing | <u>Snapping</u> |
| | Photo-Etching | <u>Spray Drying</u> |
| | Pickling | Tape casting |
| | Piercing | Turning |
| | <u>Pilger</u> | Water jet cutting |
| | Plasma Spray | |
| | Point and Chamfer | |
| | Polishing | |
| | Powder Handling | |
| | Powder Pressing | |
| | | |

| Pressing | |
|--------------------------|--|
| Reaming | |
| Roll Bonding | |
| Rolling | |
| Sanding | |
| Sawing (tooth blade) | |
| Shearing | |
| Sizing | |
| Skiving | |
| Slitting | |
| Snapping | |
| Sputtering | |
| Stamping | |
| Spray Drying | |
| Tapping | |
| Tensile Testing | |
| Torch Cutting (i.e., oxy | |
| <u>acetylene)</u> | |
| Trepanning | |
| Tumbling | |
| Turning | |

| Vapor Deposition | |
|-------------------|--|
| Water-jet Cutting | |
| Welding | |
| | |

Appendix C

an

The medical guidance for the employer and physician will be in the form of a medical surveillance fact sheet. The medical guidance for the employees and general public will be in the form of a Quick Card.

1. Definition of Confirmed Positive

OSHA agrees, within a reasonable time after issuance of a final rule amending the definition of "confirmed positive" in the beryllium standard, to include the new definition in the medical surveillance fact sheets for the physician, the employer, and the general public.

2. 1910.1024(b) Definition of BeLPT Test - OSHA agrees to include language in a medical surveillance fact sheet for the physician and a medical surveillance fact sheet for the employer to explain the BeLPT testing as follows:

There are currently only a few laboratories with sufficient expertise to perform the BeLPT. Due to some procedural differences between laboratories performing the BeLPT, careful consideration of the BeLPT test protocols and interpretation of BeLPT results should be considered prior to making a laboratory selection. Under the OSHA beryllium standard a laboratory must be certified under the College of American Pathologists/Clinical Laboratory Improvement Amendments (CLIA) guidelines to perform the BeLPT. Physicians and employers may want to review information contained within the Department of Energy Specification (DOE-SPEC-1142-2001 April 2001) Beryllium Lymphocyte Testing (BeLPT)) for background information to familiarize themselves with the BeLPT prior to selecting a laboratory (https://www.standards.doe.gov/standards-documents/3000/1142-dspec-2001/@@images/file). Because the blood sample must arrive at the testing site within 24 to 30 hours of being drawn, a key consideration is the laboratory's ability to accommodate this timeframe.

Appropriate insulating material should be used to maintain satisfactory temperature control and to avoid extreme temperature fluctuation of the cells and maximize cell viability during shipping. The samples must be labeled with patient's name, date and time blood is drawn, identification number, and name of person obtaining specimen at a minimum. Biosafety packing should be utilized. Samples or the packing material should not be refrigerated, and shipping containers should be labeled: HUMAN BLOOD, DELIVER IMMEDIATELY, DO NOT FREEZE, PERISHABLE.

3. Diagnosis of CBD - Agreement to include the following language in a medical fact sheet for the physician, a medical fact sheet for the employer, and a medical fact sheet for the employee:

Chronic Beryllium Disease (CBD) is a chronic granulomatous lung disease caused by inhalation of airborne beryllium by an individual who is beryllium-sensitized. In the early stages of CBD, an individual may not experience any symptoms. However, over time, the following symptoms may develop: shortness of breath with physical activity, dry cough that will not go away, fatigue, night sweats, chest and joint pain, or loss of appetite. A work and medical history of exposure to beryllium is an important step in diagnosing CBD. The first medical test for diagnosis of CBD is the beryllium lymphocyte proliferation test (<u>BeLPT</u>). The BeLPT is a test that determines if the immune system reacts to beryllium as a foreign substance - this reaction results in an abnormal BeLPT. In individuals who are not sensitized to beryllium and do not have CBD, the immune system does not respond to beryllium in any manner, and they have normal BeLPT results. Individuals must be sensitized to beryllium in order to develop CBD.

Individuals with either two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results are considered to be "confirmed positive" and should be encouraged to undergo further evaluation to determine if they have CBD.

4. Other Medical Tests and Information Deemed to be Appropriate by the Physician -Agreement to provide guidance to physicians in a medical fact sheet and guidance to employers as follows:

Appropriate medical tests may include exercise tolerance testing, pulmonary function testing, a chest X-ray or CT scan, blood work and diagnostic bronchoscopy with biopsy and lavage (lung washing) but the extent and applicability of these tests should be based on the patient's overall health and the physician's expert judgement. The diagnosis of CBD can be made on the basis of diagnosis of beryllium sensitization and the finding of granulomas, or by an abnormal beryllium test in the immune cells from the lungs and significantly elevated number of a particular type of an immune cell called a lymphocyte, in addition to the worker's medical and work history.

5. Subsequent Medical Exams - Agreement to include the following in a medical fact sheet or FAQ:

Does OSHA require that once an employee is referred to a CBD Diagnostic Center, the employee must continue to use the CBD diagnostic center for follow-up medical examinations required by the standard?

No. After an employee has received a clinical evaluation at a CBD diagnostic center, the employee may choose, but is not required, to have any subsequent medical examinations for which the employee is eligible under paragraph (k) of the standard performed at a CBD diagnostic center mutually agreed upon by the employer and employee. Continued evaluation

at a CBD diagnostic center may be helpful for sensitized employees and employees diagnosed with CBD because specialized evaluations may be needed to determine the appropriate tests to monitor for possible progression from sensitization to CBD and to monitor the progression of CBD if it does occur. But for employees who have not been confirmed positive, an examination with a pulmonologist at a local medical facility convenient to the worker may be appropriate if more supportive follow-up is not required at that particular time.

6. Referral to CBD Diagnostic Center – Agreement to include the following in a medical fact sheet:

As a general guide for referral to a CBD Diagnostic Center, an employee must be referred if confirmed positive or if the physician otherwise deems it appropriate (for example, because the employee is showing signs or symptoms consistent with CBD).

7. Warning Signs & Labels - Agreement to include the following in a compliance guide for employers (Small Entity Compliance Guide):

OSHA has provided required wording for labels and regulated area signs. However, OSHA intended the format of the signs and labels to be performance-oriented. For example, since CBD is the primary health concern, an employer may want to list the warning "May Cause Damage to the Lungs" before the warning "May Cause Cancer".

8. Exposure Monitoring for the Same Tasks - Agreement to include the following in an FAQ:

OSHA has included a performance option for exposure monitoring because it provides employers flexibility to assess the 8-hour TWA and STEL exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to beryllium.

OSHA considers exposures to be accurately characterized when they reflect the exposures of employees on each shift, for each job classification, in each work area. However, under the performance option, the employer has flexibility to determine how to achieve this. For example, under this option an employer could determine that there are no differences between the exposure of an employee in a certain job classification who performs a task in a particular work area on one shift and the exposure of another employee in the same job classification who performs the same task in the same work area on another shift. In that case, the employer could characterize the exposure of the second employee based on the first employee's exposure.

9. Employee Information and Training - Agreement to include the following guidance on training in the Small Entity Compliance Guide.

Employers must ensure that employees who are, or can reasonably be expected to be, exposed to airborne beryllium can demonstrate knowledge and understanding of each of the various topics in paragraph $(\underline{m})(\underline{4})(\underline{ii})$ of the beryllium standard. However, the level of detail should be tailored to the specific needs of the employee. For example, employers must inform all employees who are, or can reasonably be expected to be, exposed to airborne beryllium about the purpose, selection, fit, use, and limitations of PPE generally. But if employees are required to actually wear PPE, the employer must provide detailed information on these aspects, including the type of PPE required, donning and doffing procedures, and specific limitations of the PPE (such as breakthrough times).

Additionally, to ensure that employees do not inadvertently enter beryllium work areas and regulated areas, all employees who may be exposed to airborne beryllium must be trained on the their locations and the specific nature of the operations that can cause beryllium exposure. Employees who are assigned to work in those areas must also understand which particular operations could result in exposures above the PEL or STEL, when those exposures are likely to occur, and the specific measures employees need to take to protect themselves.

Similarly, for medical surveillance, all employees covered under this standard must be trained on the purpose of the medical surveillance program, be given at least a general description of the program, and provided an overview of the benefits and risks of the tests available under the medical surveillance program. If the employee is or may become eligible for medical surveillance, the employer must provide additional details concerning the medical surveillance program, the procedures for scheduling an appointment, and the kind of information to expect in the report that will be received by the employee.

The employer must provide, and ensure the employee understands, an appropriate level of detail on each of the requirements of the standard and should tailor the training to each employee depending on what provisions of the standard are applicable to the employee based on that employee's work and job responsibilities.

10. Use of Disposable Water-Soluble Bags for Laundering - Agreement reached for OSHA to issue a letter of interpretation and to link to the letter of interpretation in an FAQ.

11. Conditions for Offering a Powered Air Purifying Respirator (PAPR) - Agreement to include the following in an FAQ the criteria regarding offering of a PAPR upon an employee request.

The employer must provide a powered air-purifying respirator (PAPR) instead of a negative pressure respirator when all of the following are met: (1) respiratory protection is required by the beryllium standard; (2) an employee entitled to such respiratory protection requests a PAPR; and (3) the PAPR provides adequate protection to the employee.

12. Enforcement discretion in providing an examination at a CBD diagnostic center -

Agreement to explain in the medical surveillance guidance for the employer that if an employer is unable to provide an examination at a CBD diagnostic center within the 30-day timeframe required by paragraph (k)(7), OSHA will consider good-faith efforts, where an employer has documented a reasonable attempt to schedule the examination consistent with the intent of paragraph (k)(7), in determining whether or not to issue a citation. This guidance will be similar to OSHA's prior statements on the timeliness of medical examinations. See, for example,

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATI ONS&p_id=21881 ("This annual examination need not be performed on the exact anniversary date of the preceding examination, but rather should be provided on a date reasonably close to the anniversary date taking into consideration the company's and the employee's convenience in scheduling. If the annual physical examination is not completed by the anniversary date, the employer should maintain a record in the employee's file indicating why the examination has been delayed and when the examination will be provided."); https://www.osha.gov/OshDoc/Directive_pdf/CPL_02-02-074.pdf ("When an employer has previously determined that employees' exposures are at or above the action level for fewer than 30 days per year, but a change in process or task occurs that results in 30 or more days of exposure above the action level, then medical surveillance shall be made available to these employees. In such cases, the employer must make a reasonable attempt to provide a medical examination by the 30th day of exposure.").

13. As Free as Practicable FAQ

Agreement to include the following question and answer in the beryllium FAQ within a reasonable time:

How does OSHA define "as free as practicable"?

Under the beryllium standards, the employer is required to keep surfaces in beryllium work areas, materials designated for recycling (unless they are placed in sealed, impermeable containers) in general industry, and eating and drinking areas as free as practicable of beryllium. The requirement to maintain surfaces as free as practicable of a regulated substance is included in other OSHA health standards, such as those for lead (29 CFR 1910.1025, 29 CFR 1926.62), chromium (VI) (29 CFR 1910.1026), and asbestos (29 CFR 1910.1001). As OSHA explained in a 2014 letter of interpretation concerning the meaning of "as free as practicable" in the hexavalent chromium standard, OSHA evaluates whether a surface is "as free as practicable" of a contaminant by the efficacy of the employer's program to keep surfaces clean. A sufficient housekeeping program for beryllium may include a routine cleaning schedule and the use of effective cleaning methods to minimize exposure from accumulation of beryllium on surfaces. The intent of the "as-free-as-practicable" requirement is to ensure that accumulations of beryllium dust do not become sources of employee beryllium exposures. Therefore, any method that achieves this end is acceptable. OSHA further intends for this term to be broad and performance-oriented, so as to allow employers in a variety of industries flexibility to decide what type of control methods and procedures are best suited to their beryllium operations, and OSHA's beryllium standard does not specify quantitative limits for the amount of beryllium on surfaces. OSHA intends to evaluate compliance based on employer efforts under the circumstances present at each facility. For example, eating and drinking areas may need more frequent cleaning than regulated areas where workers wear PPE. Or work areas may need more frequent cleaning during periods of higher production volume. Where appropriate, based on the beryllium content of the material, employees and employers may be able to assess whether surfaces are visibly clean as a practical guide to determine the effectiveness of a housekeeping program. For example, in industries working with materials that contain more than 0.1% beryllium by weight, visible cleanliness may be a helpful indicator of whether a surface is as free as practicable. However, depending on the operations involved, visible cleanliness may not be necessary or appropriate as a barometer of compliance in industries that work with materials that contain less than 0.1% beryllium by weight. If an employer maintains a reasonable, comprehensive written exposure control plan and follows the plan, the employer would likely be considered to be in compliance with the "as-free-as-practicable" requirement.

14. As Free as Practicable FAQ

Agreement to include the following question and answer in a beryllium FAQ within a reasonable time after issuance of a final rule if the final rule adopts the amendments to 29 C.F.R. § 1910.1024 proposed in the Second NPRM relating to disposal and recycling and personal protective clothing and equipment in eating and drinking areas:

How does OSHA define "as free as practicable"?

Under the beryllium standards, the employer is required to keep surfaces in beryllium work areas, materials designated for disposal or recycling in general industry (unless they are placed in enclosures that prevent the release of beryllium-containing particulate or solutions under

normal conditions of use, storage, or transport), personal protective equipment (PPE), and eating and drinking areas as free as practicable of beryllium. The requirement to maintain surfaces as free as practicable of a regulated substance is included in other OSHA health standards, such as those for lead (29 CFR 1910.1025, 29 CFR 1926.62), chromium (VI) (29 CFR 1910.1026), and asbestos (29 CFR 1910.1001). As OSHA explained in a 2014 letter of interpretation concerning the meaning of "as free as practicable" in the hexavalent chromium standard, OSHA evaluates whether a surface is "as free as practicable" of a contaminant by the efficacy of the employer's program to keep surfaces clean. A sufficient housekeeping program for beryllium may include a routine cleaning schedule and the use of effective cleaning methods to minimize exposure from accumulation of beryllium on surfaces. The intent of the "as-free-aspracticable" requirement is to ensure that accumulations of beryllium dust do not become sources of employee beryllium exposures. Therefore, any method that achieves this end is acceptable. OSHA further intends for this term to be broad and performance-oriented, so as to allow employers in a variety of industries flexibility to decide what type of control methods and procedures are best suited to their beryllium operations, and OSHA's beryllium standard does not specify quantitative limits for the amount of beryllium on surfaces or PPE. OSHA intends to evaluate compliance based on employer efforts under the circumstances present at each facility. For example, eating and drinking areas may need more frequent cleaning than regulated areas where workers wear PPE. Or work areas may need more frequent cleaning during periods of higher production volume. Where appropriate, based on the beryllium content of the material, employees and employers may be able to assess whether surfaces are visibly clean as a practical guide to determine the effectiveness of a housekeeping program. For example, in industries working with materials that contain more than 0.1% beryllium by weight, visible cleanliness may be a helpful indicator of whether a surface or PPE is as free as practicable. However, depending on the operations involved, visible cleanliness may not be necessary or appropriate as a barometer of compliance in industries that work with materials that contain less than 0.1% beryllium by weight. If an employer maintains a reasonable, comprehensive written exposure control plan and follows the plan, the employer would likely be considered to be in compliance with the "as-free-as-practicable" requirement.

15. Agreement to issue guidance in the Small Entity Compliance Guide that use of air showers would not violate the prohibitions on cleaning methods that disperse beryllium into the air or onto an employee's body, as long as the air showers are equipped with properly-functioning HEPA-filtered ventilation and employees wear respirators while in the air shower.

Letter of Interpretation on dissolvable laundry bags

Dear Ms. Fitch:

Thank you for your letter to the Occupational Safety and Health Administration's (OSHA) Directorate of Enforcement Programs. You had a question regarding the requirements contained in OSHA's new standard for Occupational Exposure to Beryllium, 29 CFR 1910.1024 (Beryllium Standard). Your letter requests information on the use of dissolvable laundry bags and whether they comply with the provisions for personal protective clothing and equipment (PPE), specified at paragraph 1910.1024(h)(2)(v). This letter constitutes OSHA's interpretation only of the requirements herein, and may not be applicable to any questions not delineated within your original correspondence. Your paraphrased question and our response are below.

Background: In your letter, you state that it is common practice for commercial laundries to use laundry bags that dissolve in the washing machine when exposed to agitating hot water for laundering work clothing and PPE contaminated with hazardous particulate. You also state that dissolvable bags are constructed to ensure that hazardous particulates remain contained in the bag, thereby reducing the open handling of contaminated work clothing and PPE by plant workers, transporters and laundry workers.

Question: Does the use of dissolvable bags for removal of beryllium-contaminated work clothing and PPE from the workplace, for the purpose of laundering and cleaning, meet the requirement at 1910.1024(h)(2)(v) that contaminated work clothing and PPE must be stored and transported in sealed bags or other closed containers that are impermeable?

Response: OSHA's Beryllium Standard, at paragraph 29 CFR 1910.1024(h)(2)(v), states that when PPE required by the standard is removed from the workplace for laundering, cleaning, maintenance or disposal, the employer must ensure that it is stored and transported in "sealed bags or other closed containers that are impermeable" and are properly labeled, in accordance with paragraph 1910.1024(m)(3) and the Hazard Communication Standard (29 CFR 1910.1200).

OSHA considers a bag to be impermeable if it meets two requirements:

- 1) The bag must be made of material that, when closed, does not allow particles or dust to escape; and
- 2) The bag must be of sufficient quality so it cannot be punctured or torn in the specific situation of its use, storage, or transport.

If the dissolvable bag meets both of these requirements, then OSHA would consider the bag to be impermeable under 1910.1024(h)(2)(v) even though the bag is designed to dissolve in agitating hot water. This is consistent with other OSHA interpretations for impermeable bags (see OSHA letter to Michael Sember, dated April 26, 1994; and OSHA letter to Kathryn McMahon-Lohrer, dated May 31, 2007).

Whether a dissolvable bag meets the two requirements above depends on the bag manufacturer's quality and integrity testing for its known or intended use, which should also include input from downstream employers concerning the bag's performance during normal conditions of use.

Additional information about the final rule is available on OSHA's <u>beryllium</u> webpage. OSHA also provides compliance assistance resources to help employers, particularly small businesses, meet the requirements of the final rule. For compliance assistance, please contact a compliance assistance specialist at <u>www.osha.gov/dcsp/compliance_assistance/cas</u>, or visit OSHA's compliance assistance webpage at <u>www.osha.gov/employers</u>. In addition, employers and employees can call (800) 321-OSHA toll-free for workplace safety and health information or assistance 24 hours a day.

Thank you for your interest in occupational safety and health. We hope you find this information helpful. OSHA's requirements are set by statute, standards, and regulations. Our letters of interpretation do not create new or additional requirements but rather explain these requirements and how they apply to particular circumstances. This letter constitutes OSHA's interpretation of the requirements discussed. From time to time, letters are affected when the Agency updates a standard, a legal decision impacts a standard, or changes in technology affect the interpretation. To assure that you are using the correct information and guidance, please consult OSHA's website at <u>www.osha.gov</u>. If you have any further questions, please feel free to contact the Office of Health Enforcement at (202) 693-2190.

Sincerely,

Thomas Galassi, Director Directorate of Enforcement Programs