OSHA Beryllium Standard
Concerns & Differences from Proposed Standard
2017 EEI Spring Occupational Safety & Health Committee Conference
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Current Status

► OSHA issued proposed standard on 8/7/2015 and published a final standard on 1/9/2017.

► The effective date has been delayed by OSHA until May 20\textsuperscript{th}. The delay does not change the March of 2018, 2019 and 2020 compliance dates.

► OSHA made dramatic and significant changes to the final standard vs. the proposed standard at the end of the Obama administration tenure.

► Legal action has been taken by a dozen companies and industry groups representing general industry, maritime & construction.
OSHA is issuing Frequently Asked Questions (FAQs) to help employers and employees understand their compliance obligations under the new standard.

FAQs are helpful but are not legally binding and can be changed at any time.

My presentation is in the context of the language used in the final rule.
Scope of the Standard

- Final standard does not apply to materials containing less than 0.1% beryllium 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.

- Proposed standard did not apply to materials containing less than 0.1% i.e. abrasive blast media, dirt, concrete, coal slag, grinding wheels, incinerator ash, metals <0.1% Be, etc.
Beryllium is naturally found in materials and products

Beryllium is ubiquitous in all soil and is found in almost all mineral and clay based materials. Examples include:

- soil
- rock
- stone
- concrete
- bricks
- concrete block
- cement
- abrasive grinding/cutting wheels
- ceiling tiles
- powder detergents
- welding rods
- solders
- paints
- coal slag
- incinerator ash
Scope related

OSHA IMIS DATABASE
Work activities that can exceed the PEL from natural beryllium in construction materials

<table>
<thead>
<tr>
<th>Building demolition</th>
<th>Painting</th>
<th>Sandblasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting concrete</td>
<td>Boiler cleaning</td>
<td>Shot blasting</td>
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<tr>
<td>Dumping soils</td>
<td>Carpentry</td>
<td>Soldering</td>
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<tr>
<td>Road sweeper</td>
<td>Electrical work</td>
<td>Torch cutting</td>
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<tr>
<td>Road building</td>
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<tr>
<td>Jack hammering</td>
<td>Fabricating</td>
<td>General labor work</td>
</tr>
<tr>
<td>Abrasive blasting*</td>
<td>Welding</td>
<td>Needle gunning</td>
</tr>
</tbody>
</table>

* NIOSH has detected Be above PEL with glass abrasive blast products
Scope related

► OSHA preamble describes all soluble and insoluble beryllium compounds and materials, both naturally occurring and manmade as exhibiting similar toxicology and risks.

► Dermal contact applies to exposures to naturally occurring beryllium forms unless exposures will remain below the AL under any foreseeable conditions.

► Standard now includes construction and maritime. Applies to construction projects in general industry.

► No evidence of disease (CBD) provided for these industries due to naturally occurring beryllium being present in materials.
PELs and Action Limit

- 8-hour time weighted average permissible exposure limit (PEL) at 0.2 micrograms per cubic meter of air ($\mu g/m^3$)
- 15 minute limit short term exposure limit (STEL) of 2.0 $\mu g/m^3$.
- 8-hour TWA action level (AL) of 0.1 $\mu g/m^3$.

The AL triggers typical OSHA requirements like medical exams, exposure monitoring (performance vs. scheduled monitoring options), written exposure control plan, engineering controls, housekeeping, etc.
Beryllium Work Area

- Where employees can reasonably be expected to be exposed to airborne beryllium at any level.
- Where there is the potential for dermal contact with beryllium.
- As written, can apply to metal solids & dirt.
OSHA added the requirement for workers to wear Personal Protective Clothing and Equipment (PPE) to prevent dermal contact with any form of beryllium-containing material including solids.

OSHA provided no evidence that dermal contact with materials containing naturally occurring beryllium poses any beryllium-related hazard.

OSHA’s justification is based on a theory that insoluble beryllium particles can penetrate or dissolve through intact skin and cause BeS.

OSHA describes BeS as a health effect or adverse health effect. OSHA FAQ finds BeS alone involves no clinical symptoms.

OSHA used skin contact to define area restrictions.
PPE

The standard requires use of protective clothing and equipment where employee exposure exceeds, or can reasonably be expected to exceed the TWA PEL or STEL; or where there is a reasonable expectation of dermal contact with beryllium.

Change rooms are required to prevent cross contamination of street clothes with work clothes.
Disposal & Recycling

- Final standard requires materials designated for disposal or recycling that contain or are contaminated with beryllium are cleaned to be as free as practicable of surface beryllium contamination or placed in sealed, impermeable enclosures.

- Proposed standard required cleaning if visibly contaminated with beryllium to remove visible particulate or materials placed in sealed, impermeable enclosures.

- Final standard requires cleaning invisible particulate.

- Standard requires sealed and impermeable containers which requires changing the way metal scrap is handled in the recycling industry. Coal slag and incinerator ash disposal or recycle would require a like standard of care.
Medical Surveillance

► Any worker exposed above the AL >30 times/ year (no credit allowed for respiratory protection) will be required to participate in a comprehensive medical surveillance program. Proposed standard was TWA-PEL >30 times/ year

► Medical surveillance tests resulting in confirmed positive/CBD in employees requires either moving a worker to another job or medical removal benefits of 6 months’ salary plus benefits.

► OSHA does not allow employers to know why a worker is eligible for medical removal benefits without the employee providing written consent.

► Beryllium Sensitization (BeS) occurs in about 1% of the general population not occupationally exposed to beryllium in manufacturing.
Proposed standard was two abnormal test results from either consecutive BeLPTs or a second abnormal BeLPT result within a 2-year period of the first abnormal test result. Time period and protocol defined.

Final Standard confirmed positive as indicated by two abnormal BeLPT test results, an abnormal and a borderline test result, or three borderline test results.

Final standard added abnormal/borderline & 3 borderlines
- 3 borderlines not recommended by the American Thoracic Society.
CBD Diagnostic Center

Proposed standard defined CBD Diagnostic Center as a medical diagnostic center that has on-site facilities to perform a clinical evaluation for the presence of chronic beryllium disease (CBD) that includes bronchoalveolar lavage, transbronchial biopsy and interpretation of the biopsy pathology, and the beryllium bronchoalveolar lavage lymphocyte proliferation test (BeBALLPT).

Final standard defined what an evaluation must consist of and did not define a diagnostic center. Added requirements for on-site pulmonary specialist and a requirement to be able to transfer BAL samples to a laboratory within 24 hours.
Written Exposure Control Plan

Proposal had no requirement to update annually.

Final standard required updating if notified that an employee is eligible for medical removal, referred for evaluation at a CBD diagnostic center, or shows signs or symptoms associated with airborne exposure to or dermal contact with beryllium.
Regulated Area

- Both standards required establishment when PEL exceeded.

- Final Standard added “or short-term exposure limit (STEL)” to the definition
Respiratory Protection

Final Standard added a provision to offer a PAPR if an employee requests one.
Areas of Concern

- OSHA/NIOSH incorrectly refer to CBD as progressive
  - Clinical CBD vs. SubClinical CBD

- OSHA/NIOSH incorrectly refer to BeS as an adverse health effect preceding CBD. BeS is not a health effect, not a material impairment of health, nor on a continuum to CBD.

- OSHA/NIOSH incorrectly refer to skin contact with insoluble beryllium forms as causative of BeS and portray BeS via skin as on a continuum to CBD.

  - A particle dissolution hypothesis is not evidence nor a material impairment of health
  - The Curtis human study has been ignored. Tinkle study has been mischaracterized
  - Health effects of soluble vs. insoluble Be have been blurred and are highly misleading to workers.
Areas of Concern

► OSHA stated that a significant risk for CBD remains even below the new PEL of 0.2 µg/m$^3$ and AL of 0.1 µg/m$^3$.

► OSHA suggests that there is a risk of cancer even below the new PEL of 0.2 µg/m$^3$ and AL of 0.1 µg/m$^3$. OSHA did not consider the largest-ever cancer study of beryllium workers (Boffetta 2016) and relied on a NIOSH analysis that extrapolated exposure estimates to levels below the analytical detection limit of the database.

► Potential Workers Compensation issues. BeS has not been identified as a health effect under state laws.

► Potential Tort Liability issues due to OSHA’s BeS descriptions and cancer determinations.
Materion Brush Inc. Actions

Materion Brush Inc. will be providing its customers and other stakeholders a web based tool. This online tool, named the Guide to Compliance, is under development pending OSHA clarifications of the rule text via FAQs and/or reopening the record.