What’s New?

• New Construction & GI /Maritime Standards
  – 8 CCR 1532.3 & 8 CCR 5204

• PEL for respirable crystalline silica of 50 µg/m³
  – “Action Level” of 25 µg/m³

• Employers Must:
  – Assess exposures:
  – Implement eng./admin controls, respirators if needed
  – Develop exposure control plan, limit access to high exposure areas;
  – Medical exams for over exposed workers, training for all workers

• Affects Many New Industries

• Effective June 23, 2016 (unless delayed in court)
  – Requirements phase-in over 1 – 5 years
Crystalline Silica

- Silica dioxide
  - Found in sand
  - Used in glass and more
- Over-exposure leads to silicosis, lung cancer, other
- Direct measurement requires analysis of air samples
  - Real-time measurement can estimate silica exposures

OSHA Silica Standard

https://en.wikipedia.org/wiki/Crystal_oscillator
Hazardous Exposures

- Inhalation of very small ("respirable") particles
- "Respirable" particles are small – median size 4µ
- 100 times smaller than beach or playground sand
- Generated by cutting, sawing, grinding, drilling or crushing
<table>
<thead>
<tr>
<th>Physical Definitions</th>
<th>Liquid</th>
<th>Mist</th>
<th>Spray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid</td>
<td>Fume</td>
<td></td>
<td>Dust</td>
</tr>
</tbody>
</table>

**Typical Aerosols and aerosol particles**

- Vehicle Exhaust
- Fly Ash
- Cement Dust
- Coal Dust
- Pollens
- Atmospheric dust
- Bacteria
- Viruses
- Asbestos Fibre (diss.)
- Asbestos Fibre (t)

**Particle Size**

<table>
<thead>
<tr>
<th>Particle Size</th>
<th>Respirable Particles</th>
<th>Inhalable Particles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle size (μm)</td>
<td>0.01</td>
<td>0.1</td>
</tr>
</tbody>
</table>

OSHA Silica Standard
Inhalable
Thoracic
Respirable
“Size Selective” Sampling

<table>
<thead>
<tr>
<th>Size</th>
<th>50% Cutpoint</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalable</td>
<td>100 µm MMAD</td>
<td>Able to enter respiratory System (special sampler)</td>
</tr>
<tr>
<td>“Total”</td>
<td>30 µm MMAD</td>
<td>Effective cut-point of 37 mm CFC (4 mm orifice)</td>
</tr>
<tr>
<td>Thoracic/PM10</td>
<td>10 µm MMAD</td>
<td>Penetrates to the larynx (impactor)</td>
</tr>
<tr>
<td>Respirable</td>
<td>4 µm MMAD</td>
<td>Can penetrate to alveoli (cyclone or impactor)</td>
</tr>
<tr>
<td>PM2.5</td>
<td>2.5 µm MMAD</td>
<td></td>
</tr>
</tbody>
</table>

- 37 mm CFC traditionally used for IH sampling
- New particulate TLVs (ACGIH) are size-selective
Respirable Sampling

A typical sampling train

Reproduced with permission from SHC

OSHA Slica Standard
Why new Silica Standards?

• PELs outdated, inconsistent and not protective
  – Const./shipyards exposures > 2x general industry
  – 50 μg/m³ can be achieved (OSHA believes) using engineering/administrative controls

• Silicosis has declined but still a serious problem
  – 2.3 million workers are exposed to RCS
  – OSHA predicts 600 fewer deaths/yr from silica diseases, > 900 fewer cases of silicosis each year.

• Cal/OSHA adopted new standards unchanged
  – Former Cal/OSHA PELs were > proposed PEL/AL

This chest radiograph shows the multiple small nodules (arrows) with upper lobe predominance characteristics. (Courtesy of Dr. Omar Lababede)
Industries with Potential Exposures

- Construction - excavation/grading, concrete cutting/grinding
- Manufacture - stone cutting, abrasive blasting
- Oil & Gas - hydraulic fracturing
- Others??

OSHA Silica Standard

http://www.cdc.gov/niosh/docs/96-112/
http://www.hazards.org/dust/silica.htm
https://qph.is.quoracdn.net/main-qimg-95cb531b704ae36753da363773f9418b?convert_to_webp=true
Work Activities with Silica Exposures

- Abrasive blasting with sand;
- Hand-held/walk-behind masonry or concrete saw
- Sanding or drilling into masonry, concrete or rock;
- Grinding mortar, masonry or concrete (tuck point grinding)
- Jackhammer / chipping gun
- Cutting or crushing stone
- Mixing concrete, grout, etc
- Sweeping shoveling sand, dust, etc.
- Road mill
- Manufacturing brick, concrete blocks, or ceramic products
- Backhoe, excavator, bulldozer, skid-steer operation
What Do the new Standards Require?

- For Work activities with potential silica exposures
  - Implement specified controls
  - Evaluate whether exposures do/do not exceed PEL
  - Document non-exposure ("negative exposure assessment")

- Where exposures potentially exceed PEL:
  - Establish Regulated Areas
  - Implement feasible engineering/administrative controls
  - Provide medical surveillance and respiratory protection (including respirator program) where needed
  - Provide worker training
  - Develop written Exposure Control Plan
Exposure Assessment

• Using air sampling or surrogate
  – For each job classification (worst case)
  – Repeated for exposures > AL or PEL until consecutive (> 7 days apart) < AL/PEL
  – Re-assess if process changes are made
  – Notify employees of results

• Industry surveys, studies or calculations.
  – “closely resembling” or higher exp. potential than current operations.

• Or use specific “control methods” including engineering/work practice controls and PPE

OSHA Slica Standard
Use of Specified Controls

• Employers must use “feasible” engineering & administrative controls before PPE
  – Similar to existing requirement in Cal/OSHA 8 CCR 1530.1

• Specified engineering controls, work practices and respiratory protection based on work activities in Const. standard
8 CCR 1532.3 – Table 1

• “Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica”
  – Or alternate measures shown to be equally protective

<table>
<thead>
<tr>
<th>Equipment/task</th>
<th>Engineering and work practice control methods</th>
<th>Required resp. protection, min. APF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stationary masonry saws</td>
<td>• Use saw equipped with integrated water delivery system that continuously feeds water to the blade</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>• Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions</td>
<td>&gt;4 hr/ shift</td>
</tr>
</tbody>
</table>

None

OSHA Slica Standard
### Table 1 Activities

- Handheld power saws (any blade diameter)
- Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills (including impact and rotary hammer drills)
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete

- Jackhammers and handheld powered chipping tool
- Handheld grinders for mortar removal (i.e., tuckpointing)
- Handheld grinders for uses other than mortar removal
- Walk-behind milling machines and floor grinder
- Small drivable milling machines (less than half-lane)
- Large drivable milling machines (half-lane and larger)
- Crushing machines
- Heavy equipment
Respiratory Protection

• Where engineering/administrative controls cannot reduce exposures < PEL, respiratory protection is required

• Employee use of respirators for health protection is subject to Cal/OSHA Respirator standard (8 CCR 5144)
  – Mandatory medical surveillance, training, fit testing and other requirements
  – Exclusive of “voluntary use”

OSHA Slica Standard

https://www.osha.gov/SLTC/respiratoryprotection/training_videos.html
Written Exposure Control Plan

• Describes:
  – Tasks w/ potential exposures, applicable engineering controls, work practices and PPE (respiratory protection)
  – Housekeeping and procedures to restrict access to work areas where exposure potentially exceed PEL
  – Also medical surveillance, training and recordkeeping

• Reviewed annually or as needed based on operational changes

• “Competent person” w/ knowledge & ability to implement program
  – individual capable of identifying respirable crystalline silica hazards and who can take prompt corrective measures”

OSHA Slica Standard 18
Effective Dates and Applicability

• Effective June 23, 2016

• Program Implementation
  – Construction Industry - June 23, 2017 (1 year after effective date)
  – General Industry and Maritime - June 23, 2018 (2 yrs after eff. date)
  – Hydraulic Fracturing - June 23, 2018, (2 years after effective date
    with additional 3 years for Engineering Controls)

• Cal/OSHA
  – Adopted via “Horcher” process 10/17/ 216, same effective dates

• MSHA
  – Update to silica standard on regulatory rule-making agenda
Legal Challenges (as of 05/02/16)

• Construction, Manufacturing groups challenging cost, necessity and feasibility
  – NSSGA, AGC, NAHB, ABC

• Employee advocates challenged adequacy
  – AFL-CIO, UAW, United Steelworkers

• Consolidated lawsuit to be heard by Washington DC Circuit
  – Date: TBD

• Legal actions potentially disrupt implementation timeline
Building/Construction Concerns

• Feasibility
  – Industry argues that it is not practical or feasible to reduce to < 50 µg/m³
  – Alternatively, it would cost too much
  – ACGIH TLV has been 25 ug/m³ since 2010
  – Lab & field studies, as well as practical experience argues otherwise

• Necessity
  – Industry argues that there is no need for the standard, or the benefits are not worth the costs.
  – OSHA is required to do justification for new standard

• Legal process has just started – outcome TBD
“What do I do now?”

1. Identify work activities/tasks with potential silica exposures
2. For each task/activity implement standard controls/PPE or conduct exposure assessment,
3. Develop appropriate SOPs indicating engineering controls/work practices and PPE requirements
4. (stand by for legal issues to be resolved)
5. Review/Update HazCom to address silica hazards
6. Review/Update/Implement RPP as needed
7. Prepare Silica Exposure Control Plan
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