Respirable Crystalline Silica in Construction Workplaces
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Topics

• Silica hazards/reason for the rule

• Silica standard and employer responsibilities

• Steps for achieving compliance

• Compliance assistance resources

• Questions
Final Rule Published on March 25, 2016
Crystalline Silica
Question

• Where do you find silica on a construction site?
Crystalline Silica Is Found In Many Construction Materials
Respirable Crystalline Silica
Health Hazards of Silica

- Silicosis
- Lung cancer
- Chronic obstructive pulmonary disease (COPD)
- Kidney diseases
- Autoimmune diseases

“It was killing me and I had no idea. It’s just a slow death.”

—Tommy Todd
bricklayer from Oklahoma, has lung cancer related to silica dust exposure
Health Benefits

OSHA estimates that once the effects of the rule are fully realized, it will prevent:

- More than 600 deaths per year
  - Lung cancer: 124
  - Silicosis and other non-cancer lung diseases: 325
  - End-stage kidney disease: 193

- More than 900 new silicosis cases per year
Industries and Operations with Exposures

- Construction
- Glass manufacturing
- Pottery products
- Structural clay products
- Concrete products
- Foundries
- Dental laboratories
- Paintings and coatings
- Jewelry production
- Refractory products
- Asphalt products

- Landscaping
- Ready-mix concrete
- Cut stone and stone products
- Abrasive blasting in:
  - Maritime work
  - Construction
  - General industry
- Refractory furnace installation and repair
- Railroads
- Hydraulic fracturing for gas and oil
Workers and Industries Affected

- 2.3 million workers:
  - Construction: 2 million
  - GI/Maritime: 300,000

- 676,000 establishments
  - Construction: 600,000
  - GI/Maritime: 76,000
Protecting Employees

Hierarchy of Controls

Engineering Controls

Work practices

PPE (including respirators)

Decreasing Effectiveness
Engineering Controls

Cutting block without engineering controls

Cutting block using water to control the dust
Engineering Controls

Grinding mortar without engineering controls

Grinding mortar using a vacuum dust collector
Engineering Controls

Employee protected inside the cab of heavy equipment used for demolition
Construction - Scope

- All occupational exposures to respirable crystalline silica are covered, unless employee exposure will remain below 25 μg/m³ as an 8-hr TWA under any foreseeable conditions.
Construction

(a) Scope
(b) Definitions
(c) Specified exposure control methods
   OR
(d) Alternative exposure control methods
   • PEL
   • Exposure Assessment
   • Methods of Compliance
(e) Respiratory protection
(f) Housekeeping
(g) Written exposure control plan
(h) Medical surveillance
(i) Communication of silica hazards
(j) Recordkeeping
(k) Dates
Respirable Crystalline Silica Standard for Construction

Two Choices
For Employers:

1. Specified Exposure Controls
2. Alternative Exposure Controls

Other Requirements: All employers
### Example of a Table 1 Entry

<table>
<thead>
<tr>
<th>Equipment / Task</th>
<th>Engineering and Work Practice Control Methods</th>
<th>Required Respiratory Protection and Minimum APF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handheld power saws (any blade diameter)</td>
<td>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</td>
<td>≤ 4 hr/shift</td>
</tr>
<tr>
<td></td>
<td>Operate and maintain tool in accordance with manufacturers’ instruction to minimize dust</td>
<td>&gt; 4 hr/shift</td>
</tr>
<tr>
<td></td>
<td>- When used outdoors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- When used indoors or in an enclosed area</td>
<td></td>
</tr>
<tr>
<td>Equipment / Task</td>
<td>Engineering and Work Practice Control Methods</td>
<td>Required Respiratory Protection and Minimum APF</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Stationary masonry saws</td>
<td>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</td>
<td>≤ 4 hr/shift</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>
<tr>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>
List of Table 1 Entries

- Stationary masonry saws
- Handheld power saws
- Handheld power saws for fiber cement board
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tools
- Handheld grinders for mortar removal (tuckpointing)
- Handheld grinders for other than mortar removal
- Walk-behind milling machines and floor grinders
- Small drivable milling machines
- Large drivable milling machines
- Crushing machines
- Heavy equipment and utility vehicles to abrade or fracture silica materials
- Heavy equipment and utility vehicles for grading and excavating
Alternative Exposure Control Methods - Permissible Exposure Limit (PEL)

50 Micrograms per Cubic Meter of Air ($\mu g/m^3$)
Averaged over an 8-hour work day
Perspective on PEL

1,000 µg in the air of this room = 50 µg/m³

1,000 µg of silica

20 cubic meters of air

2.4 meters

3.1 meters

2.7 meters
Alternative Exposure Control Methods - Exposure Assessment

Employers must:

• Determine exposures
  – Scheduled Monitoring
  – Performance Option

• Give employees results

• Let representatives observe
Respiratory Protection

Employers must:

• Provide respirators if needed
• Follow the respiratory protection standard
Housekeeping

When cleaning silica dust, avoid:

- Dry sweeping/brushing
- Compressed air without a ventilation system to capture the dust
Written Exposure Control Plan

Employers must:

- Prepare and implement plan addressing:
  - Exposure sources
  - Controls
  - Housekeeping
  - Restricting access

- Review plan yearly

- Make it available
• If using Table 1 specified controls, does the employer have to have a written exposure control plan?
Competent Person

• Employer must identify a competent person

• What makes a competent person?

• Employees must know the competent person
Medical Surveillance

• For employees who must wear a respirator under the silica standard for 30 or more days/year

  • Offered:
    o Within 30 days of assignment
    o Every three years
Medical Exams

- Medical and work history
- Physical exam
- X-rays
Medical Exams

Tuberculosis (TB test)

Lung function test
Why Medical Exams are Important

Determine fitness to use respirator

Find disease or increased sensitivity to silica exposure

Department of Labor/Shawn T. Moore
Exams at No Cost to Employees

Employer covers costs of:

• Exams
• Tests
• Time spent traveling and getting exam
Question

• How many days of respirator use require the employee to be placed under medical surveillance?
Hazard Communication Training

- Health hazards of silica
- Specific tasks with exposure
- Measures to control exposures
- The standard (readily available to employees)
- ID of competent person
- Purpose/description of medical Surveillance
Enforcement

• October 19, 2017 – OSHA released Interim Enforcement Guidance to provide inspection guidance to compliance officers
Flowchart A: Specified Exposure Controls for Table 1 Tasks

Q1) Is any employee performing a task listed on Table 1? (see Note 1)

- **Yes**
  - Q2) Are engineering and work practice controls listed on Table 1 for that task in use?
    - **Yes**
      - Q3) Are specified engineering controls fully and properly implemented? (see Note 2)
        - **Yes**
          - Q4) Is the employee wearing the required level of respiratory protection specified on Table 1?
            - **Yes**
              - Employer is in compliance with Paragraph (c).
            - **No**
              - Employer is NOT in compliance with Paragraph (c).
        - **No**
          - Employer is in compliance with Paragraph (c).
    - **No**
      - Go to Flowchart B – Alternative Exposure Control Methods

- **No**
  - Go to Flowchart B – Alternative Exposure Control Methods
MAJOR COMPLIANCE STEPS

• Step 1:
  – Identify covered tasks (over 25μg/m$^3$)

• Step 2: Determine exposure controls
  – Use Table 1 (Specified Controls)
  – Alternative Exposure Control Methods
    • Conduct exposure assessment
    • Determine engineering/work practices/respiratory protection
Step 3: Written Exposure Control Plan
- ID covered tasks
- Describe engineering controls, work practices, and respiratory protection
- Describe housekeeping measures
- Describe plan for restricted access

- Update the plan annually
MAJOR COMPLIANCE STEPS

• Step 4: If respirators are used, develop respiratory protection program (1910.134)

• Step 5: Determine who will need medical surveillance
  – Those using respirators > 30 days per year
MAJOR COMPLIANCE STEPS

• Step 6: Hazard Communication Training to Include
  – Health hazards
  – Specific tasks with exposure
  – Measures to control exposure
  – The standard (readily available to employees)
  – ID of competent person
  – Purpose/description of medical surveillance
New Resources

Fact Sheets available for all 18 Table 1 listed tasks

https://www.osha.gov/dsg/topics/silicacrystalline/construction.html#tableOneTasks

OSHA Fact Sheet

Controlling Silica Exposures in Construction While Operating Handheld Masonry Saws

OSHA Fact Sheet

CONTROL OF SILICA DUST IN CONSTRUCTION
Handheld Grinders for Mortar Removal (Tuckpointing)

Handheld Masonry Saws

Handheld Grinders (Tuckpointing)
Guidance and Outreach

* Center for Construction Research and Training (CPWR)

* E-tool to:
  * Assess silica hazards
  * Select controls
  * Create a plan

Control the Dust

There are ways contractors can reduce the dust and reduce the hazard. This easy to use planning tool takes you step-by-step through conducting a job hazard analysis for silica, selecting appropriate controls, and creating a job-specific plan to eliminate or reduce silica hazards. You can save as a pdf, print and/or email your plan.

CREATE-A-PLAN
OSHA Consultation

* Free
* Confidential
* On-site audits
* Training
* Sampling/Monitoring
* Program Review

http://csu-cvmbs.colostate.edu/academics/erhs/osha/Pages/default.aspx
More Information

www.osha.gov/silica/