Respirable Crystalline Silica in Construction Workplaces

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What You Will Learn

• What respirable crystalline silica is

• How employees are exposed

• Health effects from breathing respirable crystalline silica
What You Will Learn

Silica standard

Workplace protections
What You Will Learn

Medical surveillance

Competent person
Crystalline Silica
Crystalline Silica Is Found In Many Construction Materials
Respirable Crystalline Silica
Workplace Tasks with Exposure

Employers must train employees on tasks in their workplace that can expose them to 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 Hazards - Silicosis

• Three types:
  o Chronic
  o Accelerated
  o Acute

• Permanent

• Can be debilitating or deadly
Symptoms of Lung Diseases

- Sometimes, no symptoms in early stage of disease
- Coughing and shortness of breath
- Fever, weight loss, exhaustion, and coughing up blood

“[Silicosis] took all five years to kill him. And we got to watch. The toughest thing was watching him come home when he couldn’t work no more and literally fell on the ground and cried. He says, ‘I can’t do it no more.’”

—Tom Ward

whose father died of silicosis at 39
Protecting Employees

Hierarchy of Controls

- Engineering Controls
- Work Practice Controls
- 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
Work Practice Controls

Example: Fixing controls that are not working properly
Respirators

Engineering Controls

Work Practice Controls

PPE (including respirators)

Decreasing Effectiveness
Specific Protections in This Workplace

Employers must train employees on workplace-specific:

• Engineering controls
• Work practice controls
• Respiratory protection
Respirable Crystalline Silica Standard for Construction

Two Choices
For Employers:

1. Specified Exposure Controls
2. Alternative Exposure Controls

Other Requirements: All employers
Specified Exposure Control Methods: Table 1

Table 1:
Handheld power saw

Table 1:
Handheld grinder for uses other than mortar removal
## 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>
</table>
| **Stationary masonry saws** | Use saw equipped with integrated water delivery system that continuously feeds water to the blade.  
Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.                                                                                               | None                                          | None                                          |
## Example of a Table 1 Entry

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| Handheld power saws (any blade diameter) | Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturers’ instruction to minimize dust  
- When used outdoors  
- When used indoors or in an enclosed area | ≤ 4 hr/shift  
None  
APF 10  
APF 10 | > 4 hr/shift |
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
• Give employees results
• Let representatives observe
Employers must select:

- Engineering controls
- Work practice controls
- Respirators, if needed
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
Housekeeping

Employers must let employees know which housekeeping methods:

– Must be used in the workplace
– Must not be used in the workplace
Written Exposure Control Plan

Employers must:

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

- Review plan yearly

- Make it available
Competent Person

- Identifies and minimizes silica hazards
- 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:
    - Within 30 days of assignment
    - 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/Shaun T. Moore
Medical Report for the Employee

- Medical conditions
- Recommended limitations on respirator use and exposure to silica
- Recommendation for specialist exam
- Only goes to the employee
Medical Opinion for the Employer

• Only medical info included:
  – Recommended respirator limitations

• Additional information requiring employee consent:
  – Recommended exposure limitations
  – Recommendation for specialist exam
Employee’s Copy of the Employer’s Written Medical Opinion

- Employees also get a copy
- Proof of exam for future employers
Exams at No Cost to Employees

Employer covers costs of:

• Exams
• Tests
• Time spent traveling and getting exam
Other Training

• Hazard communication program

• Respiratory protection program
Copy of the Standard

Employers must:
• Make a copy of the standard available
• At no charge
Recordkeeping

Employers must:

• Keep medical and exposure records
• Make them available
More Information

www.osha.gov/silica/