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OSHA Construction Crystalline Silica Rule 29 CFR 1926.1153

Objectives

- Standard Requirements
- Common construction related tasks where exposures to respirable silica may occur
- Understand exposure limits and learn control methods to limit exposures



General Requirements – Dates

- Proposed 2013
- Published March 25, 2016
- Effective June 23, 2016
- Compliance date June 23, 2017

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Crystalline Silica

- Quartz is most common form of crystalline silica
- Common mineral component of sand, stone, rock, brick, concrete, mortar



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Respirable dust

- Less than 10 Microns in diameter - Micron = 1/25,000th inch – human hair 50-80 microns

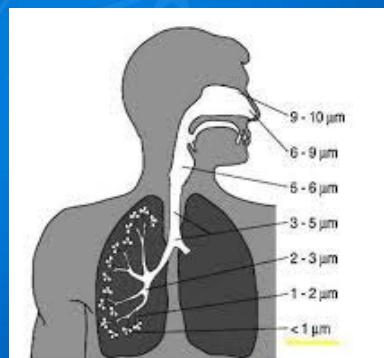


Figure 2 Particle deposition in respiratory system

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Crystalline Silica Respirable dust

- Inhaling respirable silica causes silicosis, lung cancer, pulmonary diseases, kidney disease



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Hawk's Nest Tunnel Project

- Deaths attributed to the overexposure to silica dust varies.
- At least 476 men died during construction
- At least 1,500 disabled
- 63% worked more than 2 months died within 6 years
- Some estimate deaths up to 3,000

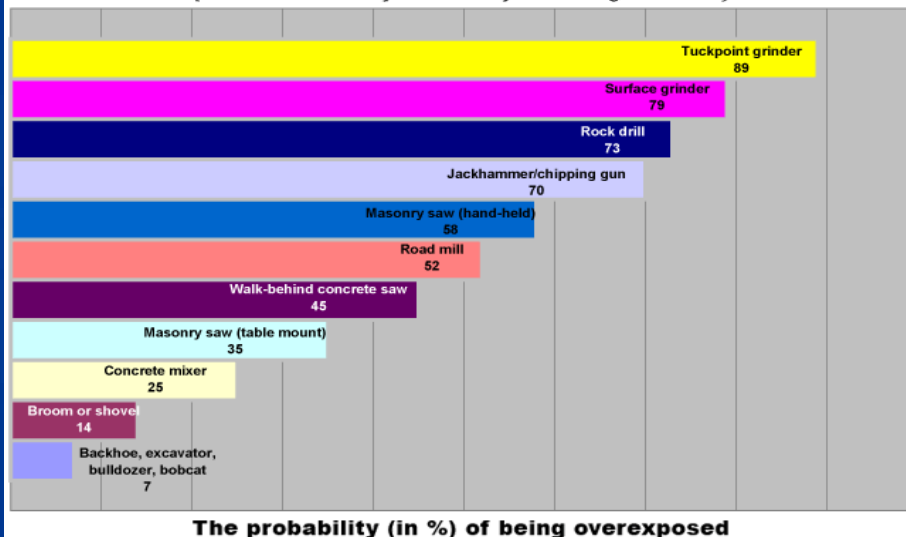
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What are your chances of being overexposed?

(Based on a Summary of University of Washington Studies)



The probability (in %) of being overexposed

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Hierarchy of Controls

- Elimination / substitution
- Engineering controls - will normally reduce exposures to less than 10x the OSHA PEL.
- Administrative controls / work practices
- PPE – breathing zone close (N95)

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Construction - Scope

- All occupational exposures to respirable crystalline silica are covered, unless employee exposure will remain below 25 $\mu\text{g}/\text{m}^3$ as an 8-hr TWA under any foreseeable conditions.
- Action Level = 25 $\mu\text{g}/\text{m}^3$ as an 8-Hour TWA

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Permissible Exposure Limit (PEL)

- Previous PEL – more than 40 years old -- based on formula hard to understand and based on obsolete particle counts
- Old PEL limits were inconsistent and evidence showed that old PEL did not adequately protect workers

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New Permissible Exposure Limit (PEL)

- PEL – 20% of old PEL
- PEL = 50 $\mu\text{g}/\text{m}^3$ as an 8-Hour TWA
- NIOSH recommended this 40 years ago and ACGIH recommends the action level as PEL

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Micrograms per Cubic Meter of Air ($\mu\text{g}/\text{m}^3$)



Empire
State
Building



Fifty (50) packets of artificial sweetener in the volume of the Empire State Building is equivalent to 50 micrograms per cubic meter of air
(50 $\mu\text{g}/\text{m}^3$) = new OSHA PEL

Approximate Volume
= 1,000,000 m^3

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General Requirements

- Limit workers exposure to respirable crystalline silica and use control methods to protect workers
 - (a) Can use table 1 of the standard
 - (b) Measure exposures and decide which dust control methods will work best
- ** tasks not listed in table 1

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General Requirements

- Establish and implement written exposure control plan
- Designate competent person to implement plan
- Restrict housekeeping practices which expose workers to silica



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General Requirements

- Offer medical exams every three years to employees required to wear respirators for more than 30 days/year
- Train workers on where exposures occur and ways to limit exposures
- Keep records of employee exposures and of medical exams (1910.1020 – record access)

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General Requirements - Specified Exposure Control Methods

Table 1

- Identifies 18 tasks
- Engineering controls or dust control methods
- Respiratory requirements

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Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
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	None	APF 10
		APF 10	APF 10

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Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Handheld grinders for mortar removal (tuckpointing)	<p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25 cubic feet per minute (cfm) of airflow per inch of wheel diameter and have filter with 99% and a cyclonic pre-separator or filter-cleaning mechanism.</p>	APF 10	APF 25

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Specified Exposure Control Methods

- Employers that fully and properly implement controls in Table 1 do not have to:
- Comply with PEL
- Conduct exposure assessments for employees engaged in those tasks

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General Requirements - Alternative Exposure Control Methods

- For tasks not listed in table 1
- Where engineering controls, work practices, and respiratory protection are not fully implemented as listed in table 1

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Alternative Exposure Control Methods

1. Employer has to ensure no employee exposed above PEL
2. Conduct Exposure assessment
 - a) Performance option
 - b) Scheduled monitoring option
3. Compliance methods

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Alternative Exposure Control Methods

- **Performance option** -- Exposures assessed using any combination of air monitoring data or objective data sufficient to accurately characterize employee exposure to respirable crystalline silica
- Objective data reflect workplace conditions resembling current operations.

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Alternative Exposure Control Methods

- **Scheduled Monitoring Option --** prescribes a schedule for performing initial and periodic personal monitoring
- Perform initial monitoring for personal breathing zones which reflect exposures based on shift, task, and work area
- If results below action level can quit monitoring

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Scheduled Monitoring Option

- Repeat monitoring every 6 months if at action level but below PEL
- If above PEL repeat monitoring every 3 months
- Discontinue monitoring if below action level from two consecutive measurements taken at least 7 days apart

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Scheduled Monitoring Option

- Reassess exposures when changes in processes, control equipment, personnel, or work practices are done

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Methods of compliance

- Have to use engineering controls to reduce and maintain exposures to or below PEL unless infeasible
- When not sufficient to reduce exposures still have to use then supplement with respiratory protection

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Tasks not listed in table 1

- Use silica free joint compounds
- Compound with 3% silica typically overexposed when sanding ceilings
- Damp sanding methods



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Tasks not listed in table 1

- Vacuum dust collection equipment
- Use pole sander and not hand sanding



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Tasks not listed in table 1

- Work methods -- Misting spray, scoop or shovel – don't pour, use walls of mixer



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General Requirements – Respirator protection

- Provide respirators when required
 - a) where specified in table 1
 - b) not following table 1 – installing engineering controls, when controls not feasible or sufficient
- Develop respirator program

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General Requirements – Housekeeping

- No dry sweeping or dry brushing
- No using of compressed air for cleaning unless used with ventilation which reduces dust cloud created by compressed air

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General Requirements – Written exposure control plan

- Description of engineering controls, work practices, respiratory protection
- Review and evaluate annually
- Make plan available to employees, representatives, OSHA
- Designate competent person to implement plan

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General Requirements – Medical Surveillance

- Medical surveillance for employees required to use respirator for more than 30 days in a year
- Medical exam performed by PLHCP
- Initial exam done within 30 days
- Periodic exams every 3 years

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General Requirements – Training

- Include silica in haz-com program
- Inform employees of health hazards associated with silica, tasks that result in exposures to silica, measures implemented to reduce exposures, and standard

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General Requirements – Recordkeeping

- Air monitoring data
- Objective data
- Medical surveillance and medical records data

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Summary

Standard Requirements

Common construction tasks where exposures to respirable silica may occur

Understand exposure limits and learn control methods to limit exposures

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Questions ?

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