OSHA's Respirable Crystalline Silica Rule 1926.1153

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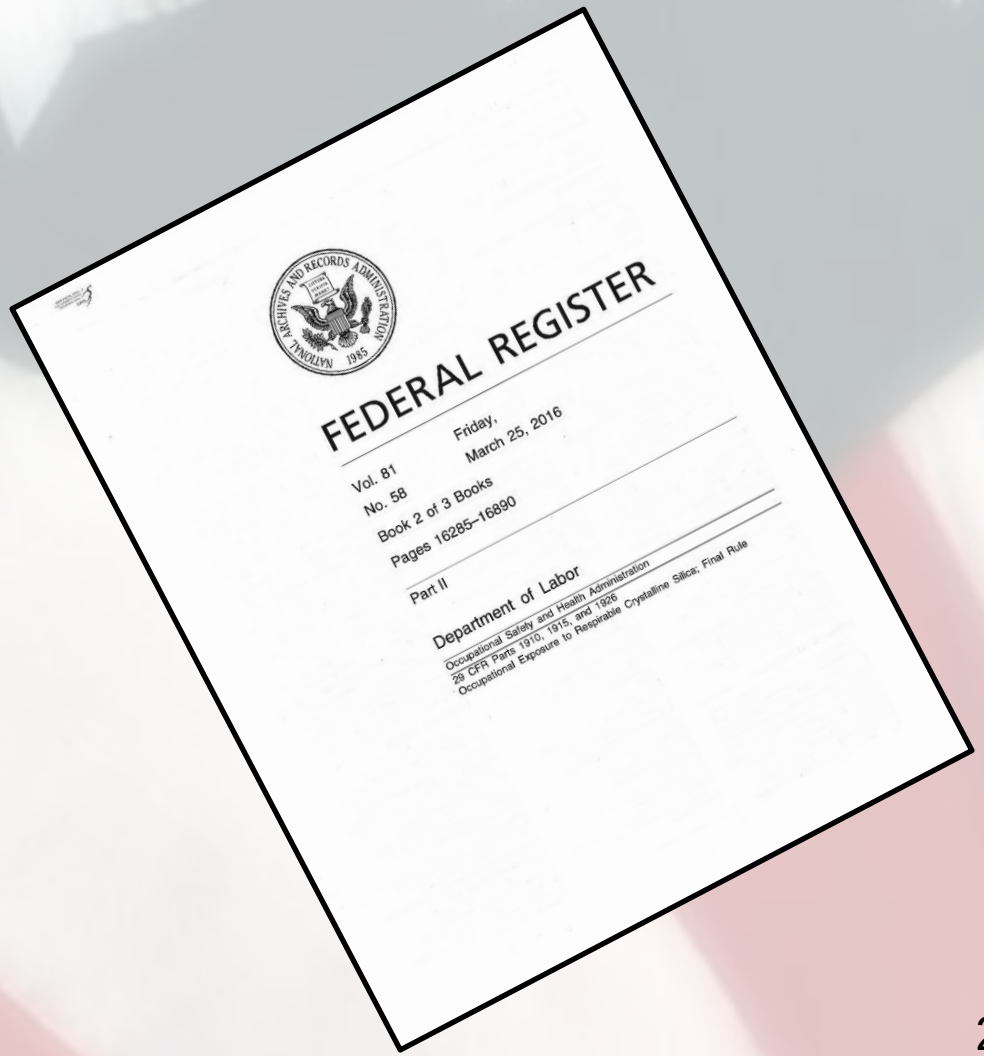
Enforcement started September 23, 2017



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Exposure and Health Risks

- **Exposure to respirable crystalline silica has been linked to:**
  - **Silicosis;**
  - **Lung cancer;**
  - **Chronic obstructive pulmonary disease; and**
  - **Kidney disease**

Healthy Lung

Silicotic Lung

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Scope of Coverage

- Three forms of silica: quartz, cristobalite and tridymite
- Exposures from chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products (such as in construction operations)
- Exposures from using sand products (such as glass manufacturing, foundries, and sand blasting)

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Respirable Crystalline Silica Rule

- **Two standards:**
  - **One for general industry and maritime**
  - **One for construction**
- **Similar to other OSHA health standards and ASTM consensus standards**

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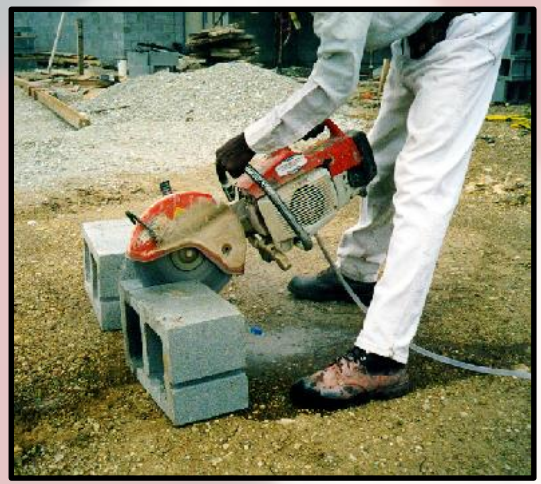
Construction Standard

(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



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Scope

- **All construction occupational exposures to respirable crystalline silica are covered, except where employee exposure will remain below 25 µg/m^3 as an 8-hr TWA under any foreseeable conditions.**
- **General industry employers can follow the construction standard in some very limited circumstances**
- **All occ. exposures – No threshold conc.**

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Specified Exposure Control Methods

- **Table 1 in the construction standard matches 18 tasks with effective dust control methods and, in some cases, respirator requirements.**
- **Employers that fully and properly implement controls on Table 1 do not have to:**
  - **Comply with the PEL**
  - **Conduct exposure assessments for employees engaged in those tasks**

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Example of Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions. OR When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None None	None None

Example of Table 1 Entry

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

Example of Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Handheld power saws for cutting fiber cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

List of Table 1 Entries

- 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
- 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

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When Implementing the Control Measures Specified in Table 1

- For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

When Implementing the Control Measures Specified in Table 1

- **For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:**
  - **Is maintained as free as practicable from settled dust;**
  - **Has door seals and closing mechanisms that work properly;**
  - **Has gaskets and seals that are in good condition and working properly;**
  - **Is under positive pressure maintained through continuous delivery of fresh air;**
  - **Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range;**
  - **Has heating and cooling capabilities.**

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When Implementing the Control Measures Specified in Table 1

- **Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift.**
- **If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.**

Alternative Exposure Control

- **For tasks not listed in Table 1, or where the employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1**

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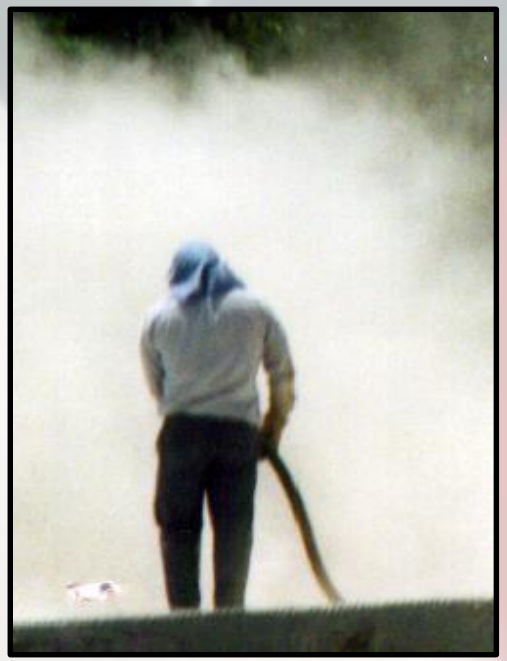
Permissible Exposure Limit (PEL)

- PEL = 50 µg/m^3 as an 8-Hour TWA
- Action Level = 25 µg/m^3 as an 8-Hour TWA



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Exposure Assessment

- **Required if exposures are or may reasonably be expected to be at or above action level of 25 µg/m^3**
- **Exposures assessments can be done following:**
  - **The performance option**
  - **The scheduled monitoring option**

Performance Option

- **Exposures assessed using any combination of air monitoring data or objective data sufficient to accurately characterize employee exposure to respirable crystalline silica**
- **Accurately characterizing employee exposures under the performance option is an ongoing duty - a change in production, process, control equipment, etc.**

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Objective Data

- Air-monitoring data from industry-wide surveys or calculations based on the composition of a substance;
- Demonstrates employee exposure associated with a particular product or material or a specific process, task, or activity;
- Reflect workplace conditions closely resembling or with a higher exposure potential than the employer's current operations.

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Scheduled Monitoring Option

- **Prescribes a schedule for performing initial and periodic personal monitoring**
- **If monitoring indicates:**
  - **Initial below the AL: no additional monitoring**
  - **Most recent at or above the AL: repeat within 6 months**
  - **Most recent above the PEL: repeat within 3 months**
  - **When two consecutive, non-initial, results, taken 7 or more days apart, are below the AL, monitoring can be discontinued**
  - **Reassess if circumstances change**

Employee Notification

- **Notify in writing with in 5 days (15)**
- **Post results**
- **Employee exposure above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.**
- **Affected employees or their designated representatives must have an opportunity to observe any monitoring**

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Methods of Compliance – Hierarchy of Controls

- Employers can use any engineering or work practice controls to limit exposures to the PEL
- Must use controls even if not sufficient
- Respirators permitted where PEL cannot be achieved with engineering and work practice controls

Engineering Controls

Grinding stone
without engineering controls

Polishing stone using water to control the dust

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Engineering Controls

Grinding without engineering controls

Grinding using a vacuum dust collector

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Engineering Controls

Jackhammer use without engineering controls

Jackhammer use with water spray to control dust

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Abrasive Blasting

- **In addition to implementing engineering and work practice control, the employer shall comply with other OSHA standards, when applicable, such as 29 CFR 1926.57 (Ventilation), where abrasive blasting is conducted using crystalline silica containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.**

Respiratory Protection

- **Must comply with 29 CFR 1910.134**
- **Required:**
  - **Where specified by Table 1, or**
  - **For tasks not listed in Table 1, or**
  - **Where the employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1**
  - **While installing or implementing controls or work practices if PELs are exceeded**

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Respiratory Protection

- **Required:**
  - **For tasks where controls or work practices are not feasible**
  - **When feasible controls cannot reduce exposures to the PEL**
- **Employers that fully and properly implement controls on Table 1 will be considered in compliance for the selection of respirators**
- **Institute a respiratory protection program that complies with 29 CFR 1910.134**

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Housekeeping

- When it can contribute to exposure, employers must not allow:
  - Dry sweeping or brushing
  - Use of compressed air for cleaning surfaces or clothing, unless it is used with ventilation to capture the dust
- Those methods can be used if no other methods like HEPA vacuums, wet sweeping, or use of ventilation with compressed air are feasible

Written Exposure Control Plan

- **The plan must describe:**
  - **Tasks involving exposure to respirable crystalline silica**
  - **Engineering controls, work practices, and respiratory protection for each task**
  - **Housekeeping measures used to limit exposure**
  - **Procedures used to restrict access to work areas to minimize the number of employees exposed and their level of exposure, including exposures generated by other employers.**

Written Exposure Control Plan

- **Annually reviewed and/or updated.**
- **Designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.**
- **Readily available**

Medical Surveillance

- **Employers must offer medical examinations to workers:**
  - **Who will be required to wear a respirator under the standard for 30 or more days a year.**
- **Employers must offer examinations every three years to workers who continue to be exposed above the trigger**
- **Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)**

Medical Opinion

- **Worker receives report with detailed medical findings**
- **Employer receives an opinion that only describes limitations on respirator use, and if the worker gives written consent, recommendations on:**
  - **Limitations on exposure to respirable crystalline silica, and/or**
  - **Examination by a specialist**

Communication

- In accordance to HCS
- Can demonstrate knowledge and understanding
  - Health hazards to be addressed: Cancer, lung effects, immune system effects, and kidney effects
  - Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
  - Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
  - The contents of the standard
  - Identity of the competent person
  - The purpose and a description of the medical surveillance program.

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Recordkeeping

- Air monitoring data
- Objective data
- Medical surveillance
- Specific information required
- Keep according to 1910.1020

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

Silica, Crystalline

- Health Effects
- Construction
- General Industry and Maritime
- Sampling and Analysis
- FAQs

Construction

Complying with the Construction Standard | Construction Resources

OSHA's Respirable Crystalline Silica standard for construction requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers.

The standard provides flexible alternatives, which OSHA expects will be especially useful for small employers. Employers can either use the control methods laid out in Table 1 of the construction standard, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures to the PEL in their workplaces.

Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a written exposure control plan that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur.
- Designate a competent person to implement the written exposure control plan.
- Restrict housekeeping practices that expose workers to silica where feasible alternatives are available.
- Offer medical exams–including chest X-rays and lung function tests–every three years for workers who are required by the standard to wear a respirator for 30 or more days per year.
- Train workers on work operations that result in silica exposure and ways to limit exposure.
- Keep records of exposure measurements, objective data, and medical exams.

Construction employers must comply with all requirements of the standard by September 23, 2017, except requirements for laboratory evaluation of exposure samples, which begin on June 23, 2018.

Construction Outreach Materials

OSHA Small Entity Compliance Guide for Construction. Discusses suggested engineering and work practice controls, exposure assessments, respirator use, medical surveillance, written exposure control plans, and other aspects of compliance.

OSHA's Crystalline Silica Rule: Construction. Provides a summary of the requirements of the respirable crystalline silica standard for construction.

OSHA Standards, Interpretations, and Directives

Construction Industry (29 CFR 1926)

- 1926 Subpart Z, Toxic and Hazardous Substances
  - 1926.1153, Respirable Crystalline Silica
    - Appendix A, Methods of Sample Analysis
    - Appendix B, Medical Surveillance Guidelines
- Federal Register Notice

OSHA Directives

- Interim Enforcement for the Respirable Crystalline Silica in Construction Standard
- Search all available directives.

Standard Interpretations

- Search all available standard interpretations.

Frequently Asked Questions

- Search all available frequently asked questions (FAQs) for the silica rule.

State Standards

There are twenty-eight OSHA-approved State Plans, operating state-wide occupational safety and health programs. State Plans are required to have standards and enforcement programs that are at least as effective as OSHA's and may have different or more stringent requirements.

Applying water to a saw blade when cutting materials that contain crystalline silica — such as stone, rock, concrete, brick, and block — substantially reduces the amount of dust created during these operations.

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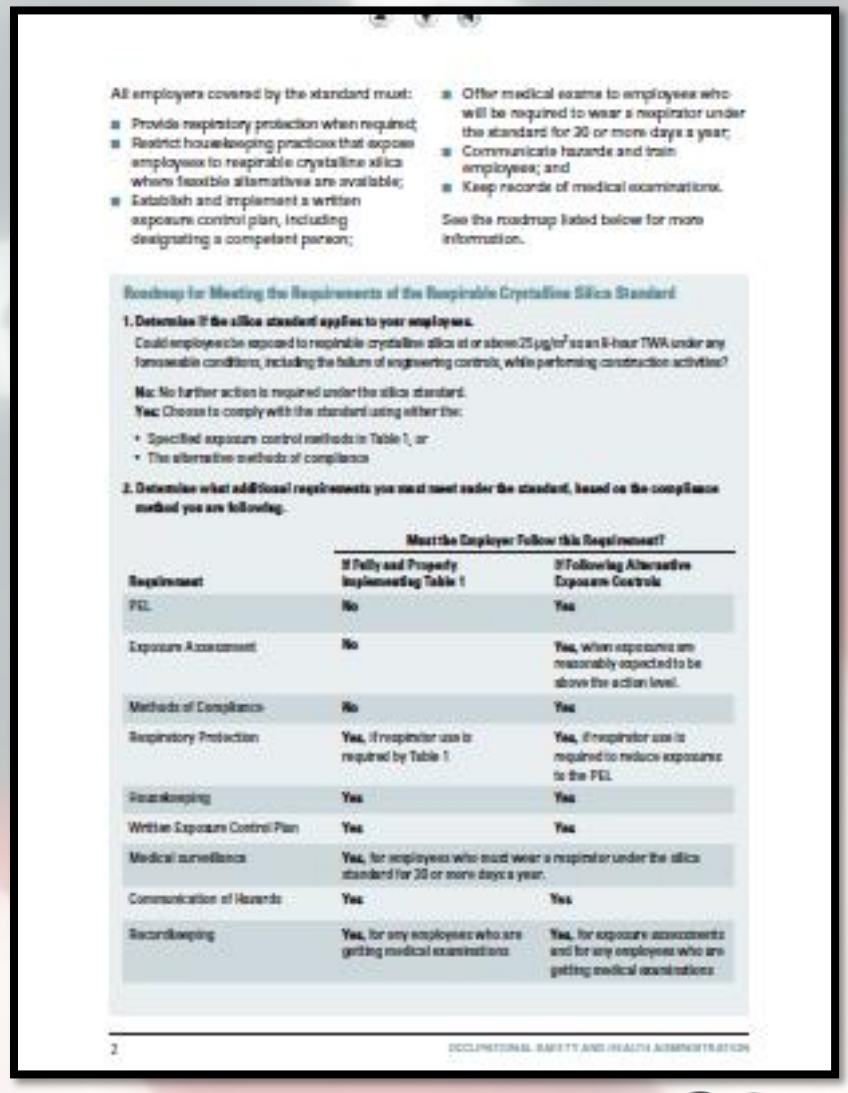
https://www.osha.gov/Publications/OSHA3902.pdf



All employers covered by the standard must:

- Provide respiratory protection when required;
- Restrict housekeeping practices that expose employees to respirable crystalline silica where feasible alternatives are available;
- Establish and implement a written exposure control plan, including designating a competent person;
- Offer medical exams to employees who will be required to wear a respirator under the standard for 30 or more days a year;
- Communicate hazards and train employees; and
- Keep records of medical examinations.

See the roadmap listed below for more information.

Roadmap for Meeting the Requirements of the Respirable Crystalline Silica Standard

1. Determine if the silica standard applies to your employee.

Could employee be exposed to respirable crystalline silica at or above 25 µg/m³ as an 8-hour TWA under any foreseeable conditions, including the failure of engineering controls, while performing construction activities?

No: No further action is required under the silica standard.
Yes: Choose to comply with the standard using either the:

- Specified exposure control methods in Table 1, or
- The alternative methods of compliance

2. Determine what additional requirements you must meet under the standard, based on the compliance method you are following.

Requirement	Must the Employer Follow this Requirement?	
	If Fully and Properly Implementing Table 1	If Following Alternative Exposure Controls
PEL	No	Yes
Exposure Assessment	No	Yes, when exposures are reasonably expected to be above the action level.
Methods of Compliance	No	Yes
Respiratory Protection	Yes, if respirator use is required by Table 1	Yes, if respirator use is required to reduce exposures to the PEL
Housekeeping	Yes	Yes
Written Exposure Control Plan	Yes	Yes
Medical surveillance	Yes, for employees who must wear a respirator under the silica standard for 30 or more days a year.	
Communication of Hazards	Yes	Yes
Recordkeeping	Yes, for any employees who are getting medical examinations	Yes, for exposure assessments and for any employees who are getting medical examinations

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TABLE 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(re) Walk-behind 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. • When used outdoors. • When used indoors or in an enclosed area.	None APF 10	None APF 10

Walk-behind saws must be equipped with an integrated water delivery system (commercially developed specifically for the type of tool in use) that continuously feeds water to the blade. The tool must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions. Full and proper implementation of water controls on walk-behind saws requires the employer to ensure that:

- An adequate supply of water for dust suppression is used;
- The spray nozzles are working properly to apply water at the point of dust generation;
- The spray nozzles are not clogged or damaged; and
- All hoses and connections are intact.

Table 1 does not specify a minimum flow rate; however, water must be applied at the flow rate specified by the manufacturer.

Walk-behind saws used to cut roads and cut pavement are most commonly used outdoors, though they can also be used indoors to cut concrete floors. When using walk-behind saws indoors or in enclosed areas (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust, as needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.

When working outdoors, respiratory protection is not required for work with walk-behind saws regardless of task duration. When working indoors, or in an enclosed location, respiratory protection with a minimum APF of 10 is required regardless of task duration.

Worker using a walk-behind saw to cut a road and wearing respiratory protection.

Photo courtesy of CDC.

Other Resource Information

- **CPWR — The Center for Construction Research and Training**
  - http://www.cpwr.com/
  - http://www.silica-safe.org/
  - http://www.elcosh.org/document/1474/d000074/Controlling%2BSilica%2BExposures%2Bin%2BConstruction.html#9

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Questions?