

OSHA’s Respirable Crystalline Silica Standard for Construction

Workers who are exposed to respirable crystalline silica dust are at increased risk of developing serious silica-related diseases. OSHA’s standard requires employers to take steps to protect workers from exposure to respirable crystalline silica.

What is Respirable Crystalline Silica?

Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. When workers cut, grind, drill, or crush materials that contain crystalline silica, very small dust particles are created. These tiny particles (known as “respirable” particles) can travel deep into workers’ lungs and cause silicosis, an incurable and sometimes deadly lung disease. Respirable crystalline silica also causes lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. In most cases, these diseases occur after years of exposure to respirable crystalline silica.

How are Construction Workers Exposed to Respirable Crystalline Silica?

Exposure to respirable crystalline silica can occur during common construction tasks, such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; operating vehicle-mounted drilling rigs; milling; operating crushing machines; using heavy equipment for demolition or certain other tasks; and during abrasive blasting and tunneling operations. About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.

What Does the Standard Require?

The standard (29 CFR 1926.1153) requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. Employers can either use a control method 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 in their workplaces to the permissible exposure limit (PEL).

What is Table 1?

Table 1 matches 18 common construction tasks with effective dust control methods, such as using water to keep dust from getting into the air or using a vacuum dust collection system to capture dust. In

some operations, respirators may also be needed. Employers who follow Table 1 correctly are not required to measure workers’ exposure to silica from those tasks and are not subject to the PEL.

Table 1 Example: Handheld Power Saws

If workers are sawing silica-containing materials, they can use a saw with a built-in system that applies water to the saw blade. The water limits the amount of respirable crystalline silica that gets into the air.

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 hrs/ shift	> 4 hrs/ 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 manufacturer’s instructions to minimize dust emissions. <ul style="list-style-type: none"> • When used outdoors. • When used indoors or in an enclosed area. 	None	APF 10
		APF 10	APF 10

Excerpt from Table 1 in 29 CFR 1926.1153

In this example, if a worker uses the saw outdoors for four hours or less per day, no respirator would be needed. If a worker uses the saw for more than four

hours per day or any time indoors, he or she would need to use a respirator with an assigned protection factor (APF) of at least 10, such as a NIOSH-certified filtering facepiece respirator that covers the nose and mouth (sometimes referred to as a dust mask). See the respiratory protection standard (29 CFR 1910.134) for information on APFs.

Alternative Exposure Control Methods

Employers who do not fully implement the control methods on Table 1 must:

- **Determine the amount of silica that workers are exposed to** if it is, or may reasonably be expected to be, at or above the **action level of 25 µg/m³** (micrograms of silica per cubic meter of air), averaged over an 8-hour day;
- Protect workers from respirable crystalline silica exposures above the **PEL of 50 µg/m³**, averaged over an 8-hour day;
- Use **dust controls** and safer work methods to protect workers from silica exposures above the PEL; and
- Provide **respirators** to workers when dust controls and safer work methods cannot limit exposures to the PEL.

What Else Does the Standard Require?

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, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe 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 the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.

Additional Information

Additional information on OSHA's silica standard can be found at www.osha.gov/silica.

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education.

OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-Site Consultation Program nearest you, call 1-800-321-OSHA or visit www.osha.gov/consultation.

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.



Applying water to the blade of a handheld power saw reduces the amount of dust created when cutting.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.



U.S. Department of Labor



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WRITTEN EXPOSURE CONTROL PLAN

Company: _____

Date: _____

Name of Competent Person: _____

Contact Info: _____

Jobsite/Project: _____

Brief description of the work / task: _____

Materials (check all that apply):

Brick / Block

Granite

Concrete

Tile

Mortar / grout

Fiber-cement Board

Rock

Soil

Stone

Other: _____

Tasks (check all that apply):

Cutting/sawing

Sacking/patching

Drilling

Roofing

Jackhammering/chipping

Polishing

Grinding

Abrasive sandblasting

Milling

Mixing/pouring

Earthmoving

Sweeping/cleaning up

Demolishing/disturbing

Other: _____

Sanding

Describe the specific tasks that will be performed that involve exposure to respirable crystalline silica:

Equipment (check all that apply):

Hand-held saw with vacuum

Hand-held angle grinder with vacuum

Hand-held saw with water

Tuckpointing grinder with vacuum

Stationary masonry saw with vacuum

Walk behind milling machine with water

Stationary masonry saw with water

Portable mixing station with vacuum

Walk-behind saw with water

Dust collector/vacuum for sweeping

Handheld/stand mounted drill with vacuum

Grading or excavating in enclosed cab

Jackhammer/chipping tool with vacuum

Grading or excavating with water

Jackhammer/chipping tool with water

Other: _____

Describe the specific equipment (including all components) that will be used on the job: _____

Work Practice Controls (check all that apply):

Wet cutting:

Operate and maintain tools in accordance with manufacturer's instructions

Check flow rates to minimize release of visible dust

Ensure spray nozzle is working properly

Apply water at the point of dust generation

Check spray nozzle and hoses to ensure they are not clogged or damaged

Check all hoses and connections to ensure they are intact

Rinse or replace water filters as needed

Replace water when it gets gritty or begins to silt up with dust

Other: _____

Vacuum Dust Collection System:

Operate and maintain tools in accordance with manufacturer's instructions

Check shrouds and hoses to ensure they are not clogged or damaged

Check all hoses and connections to ensure they are intact

Ensure that the vacuum has enough suction to capture dust at the cutting point

Change or clean filter(s) in accordance with the manufacturer's instructions

Empty dust collection bags often to avoid overfilling

Keep blade flush against the surface whenever possible

Other: _____

Tasks performed indoors or in enclosed areas:

Provide exhaust to minimize the accumulation of visible airborne dust.

Portable fans (box fans, floor fans, and axial fans)

Portable ventilation systems

Other systems that increase air movement

Describe the work practice controls that will be used on the job: _____

Respirator Protection (check all that apply):

- "N-95" dust mask respirator
- Half-facepiece elastomeric respirator
- Full-face elastomeric respirator
- Powered air-purifying respirator
- Other: _____

**Ensure that all employees who wear a respirator are medically fit to wear a respirator, have been fit-tested and trained on the proper way to wear the respirator and are clean-shaven.

Describe the specific respirators that will be used to limit employee exposure: _____

Housekeeping Controls (check all that apply):

- Wet sweeping of work surfaces
- Use Sweeping compound
- HEPA-filtered vacuuming of work surfaces
- Dispose of used vacuum bags in a container
- No dry sweeping
- No compressed air
- Other: _____

Describe the specific housekeeping measures that will be used to limit employee exposure: _____

Restrict Access (check all that apply):

- Schedule certain tasks when others are not around
- Post warning signs, cones or barrier tape
- Tell employees to stay out of areas where dust is generated if they do not need to be in the area
- Move employees to areas where they are not exposed to dust if possible
- Other: _____

Describe the specific procedures to restrict access to work areas to minimize the number of employees exposed to silica dust: _____
