

# Respirable Crystalline Silica in Construction

Protect construction workers from the hazards of silica exposure.



Approximately two million construction workers are exposed to respirable crystalline silica in over 600,000 U.S. workplaces. Crystalline silica is a mineral found in many construction materials such as sand, stone, concrete, brick, and mortar. When these materials are cut, ground, drilled or crushed, they generate very small airborne dust particles that can enter workers' lungs. Workers exposed to this dust are at an increased risk of developing silica-related illnesses that may be incurable or fatal, such as silicosis, lung cancer, respiratory diseases, or kidney diseases. Tools used in construction that can generate respirable crystalline silica include:

## Definitions (29CFR 1926.1153)

**Table 1:** Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica.

**Action Level:** Means a concentration of airborne respirable crystalline of 25 micrograms per cubic meter of air, calculated as an 8-hour TWA.

**Permissible Exposure Limit (PEL):** The employer shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50 micrograms per cubic meter of air, calculated as an 8-hour TWA.

**Time-Weighted Average (PEL-TWA):** This is the time-weighted average concentration for a conventional eight-hour workday and 40-hour work week, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect (NSC).

Tools that create dust as a byproduct by sawing, grinding, drilling, milling, blasting, hammering, dry mixing, or other physical actions on objects containing crystalline silica will generate a silica exposure that should be assessed.

The National Institute for Occupational Safety and Health (NIOSH) further states that construction workers may be easily exposed to respirable crystalline during the following:

- Chipping, hammering, and drilling of rock
- Crushing, loading, hauling, and dumping of rock
- Abrasive blasting using silica sand as the abrasive
- Abrasive blasting of concrete (regardless of abrasive used)
- Sawing, hammering, drilling, grinding, and chipping of concrete or masonry
- Demolition of concrete and masonry structures
- Dry sweeping or pressurized air blowing of concrete, rock, or sand dust.

Even materials containing small amounts of crystalline silica may be hazardous if they are used in ways that produce high dust concentrations.

OSHA's construction silica standard (29 CFR 1926.1153) establishes methods for identifying and limiting worker exposures below the permissible exposure limit (PEL) for respirable silica. Employers have two options for controlling silica exposures. They can follow Table 1 control methods laid out in OSHA's standard (29 CFR 1926.1153(c)(1)), or measure workers' exposure to silica independently and decide which controls best limit exposures below the PEL.

Table 1 matches 18 common construction equipment tasks with engineering and work practice control methods. These controls include using water to prevent particles from becoming airborne, using vacuum systems with filters designed to capture respirable dust, and may include using respirators. By following Table 1 correctly, employers are not required to measure workers' exposure to the silica PEL for those 18 tasks contained in 1926.1153 (d).

**Table 1 Example:** Stationary Masonry Saw

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	What does <i>full and proper implementation</i> require?
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	Water Controls:  An adequate supply of water for dust suppression is used;  The spray nozzle is working properly to apply water at the point of dust generation;  All hoses and connections are intact.

If employers do not fully implement Table 1 control methods or when the task with potential silica exposure is not included in Table 1, the employer must:

- Determine the amount of silica workers are exposed to or may reasonably be exposed to, averaged over an 8-hour day with the action level being at or above 25 micrograms of silica per cubic meter.

- Provide protection for workers with an exposure above the PEL of 50 micrograms per cubic meter.
- For exposures exceeding the PEL, provide dust controls and safe work methods to provide protection.
- Implement a respiratory protection program that provides the proper respirators, medical evaluations, fit testing, and training when dust controls and safe work methods cannot limit exposures below the PEL.

Regardless of whether Table 1 controls or alternative exposure controls are used, construction employers who have employee(s) exposed to the Action Level or above in normal operations or during any foreseeable condition are required to:

- Establish and implement a written exposure control plan that identifies tasks that involve exposure and methods needed to protect workers (1926.1153(g)).
- Have a competent person designated to implement the written control plan (1926.1153(b)).
- Restrict housekeeping practices that would expose workers to silica, such as using compressed air or dry sweeping, when effective safer alternatives are available (1926.1153(f)).
- Offer medical exams that include chest X-rays and function lung tests every three years for workers who are required by the standard to wear a respirator for 30 or more days during the year (1926.1153(h)).
- Train workers on the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure (1926.1153(i)).
- Maintain records of workers' silica exposure and medical exams (1926.1153(i)).

## State Standards

There are 28 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.

## Resources:

<https://www.osha.gov/dsg/topics/silicacrystalline/>

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

<https://www.osha.gov/Publications/OSHA3911.pdf>



Ensure a competent person has reviewed the silica exposure control plan.

Providing solutions to help our members manage risk.®

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For your risk management and safety needs, contact Nationwide Loss Control Services: 1-866-808-2101 or [LCS@nationwide.com](mailto:LCS@nationwide.com).