

The Dangers of Silica Exposure

What is silicosis?

Silicosis is a disease of the lungs caused primarily by the breathing of dust containing crystalline silica particles. This dust can cause fibrosis or scar tissue formations in the lungs that reduce the lung's ability to work to extract oxygen from the air. There is no cure for this disease, thus, prevention is the only answer.



ARE YOU POTENTIALLY AT RISK?

If you do the following to concrete, mortar, sand, rock, masonry and some paints:

✦ Cut or saw

✦ Grind

✦ Drill

✦ Jackhammer

✦ Crush or demolish

✦ Abrasive or sand blast

Then the answer is YES!

Why it's deadly

You can be in danger even if you don't see the dust. When you breathe dust that contains silica, the tiny particles may damage your lungs. Silicosis can form in your lungs in as little as a few weeks of very high dust exposure. Even breathing small amounts over time can cause disease years later. By the time it gets hard to breathe, you are already sick and there is no cure for silicosis. Silica dust may also cause lung cancer or increase your chance of getting tuberculosis - and it has been linked to COPD and other illnesses.

Protect yourself

The good news is that silicosis is preventable! When using power tools, the use of dust attachments, HEPA dust extraction and respiration equipment are critical to helping reduce silica exposure.

Ensure jobsite compliance

Following the September, 2017 enforcement date (and subsequent grace period) and depending on the other State and local regulations, OSHA has now fully-implemented a final rule to help curb lung cancer, silicosis, chronic obstructive pulmonary disease and kidney disease in America's workers as related to silica dust by eliminating their exposure to respirable crystalline silica. Since then, OSHA has released a number of updates to provide guidance and clarification.

Key Provisions

- Reduces the permissible exposure limit (PEL) for respirable crystalline silica to 50 micrograms per cubic meter of air, averaged over an 8-hour shift.
- Requires employers to: use engineering controls (such as water or ventilation) to limit worker

exposure to the PEL; provide respirators when engineering controls cannot adequately limit exposure; limit worker access to high exposure areas; develop a written exposure control plan, offer medical exams to highly exposed workers, and train workers on silica risks and how to limit exposures.

- Provides medical exams to monitor highly exposed workers and gives them information about their lung health.
- Provides flexibility to help employers —especially small businesses — protect workers from silica exposure.


Employers can use control methods that reduce the exposure below the PEL by following an OSHA-specified exposure control method (see Table 1 below), measuring workers' exposure to silica independently, or using objective data sufficient to accurately characterize employee exposures to respirable crystalline silica (Section (d)(2)(ii). Regardless of which control methods are used, all construction employers covered by the standard are required to:

- Establish and implement a written exposure plan and designate a competent person to implement the plan
- Restrict housekeeping practices that expose workers to silica
- Offer medical exams every three years for workers who wear a respirator 30 or more days per year
- Train workers on operations that result in silica exposure
- Keep records of workers' silica exposure and medical exams

OSHA REGULATIONS—DRY DRILLING

Table 1 Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

HAMMERS & CHISELING—CONCRETE DUST COLLECTION

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
Handheld and Stand-Mounted Drills (including Impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowl with Vacuum Dust Collection System and maintain in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer and have a filter with 99% (or greater) efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None
Jackhammers and Handheld Powered Chipping Tools	Use tool equipped with commercially available shroud and Vacuum Dust Collection System. Operate and maintain 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 and a filter-cleaning mechanism.		
	 Wet Methods- When jackhammering, wetting must occur with a continuous stream or spray of water at the point where the jackhammer's tip strikes the surface material. Employers may use manual spraying or water spray systems. Using either approach, water must be applied at a flow rate sufficient to minimize the release of visible dust. See Fact Sheet at WhiteCap.com/SilicaRule for more details.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10

OSHA REGULATIONS—DRY GRINDING AND CUTTING

Table 1 Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

GRINDING & CUTTING—CONCRETE DUST COLLECTION

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/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 Vacuum 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

DRY GRINDING AND CUTTING—CONCRETE DUST COLLECTION

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
Handheld grinders for uses other than mortar removal	Use grinder equipped with Vacuum Dust Collection System. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.		
	Grinders equipped with an integrated water delivery system can be used to control dust when cutting, grinding, or polishing granite, concrete or other materials containing crystalline silica outdoors. A water faucet or pressurized container can be used to supply a constant spray of water to the grinding wheel. When used outdoors, waterfed grinders can control dust on uneven surfaces and near corners and edges more effectively than Vacuum Dust Collection Systems.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10



DRY GRINDING AND CUTTING—CONCRETE DUST COLLECTION

Equipment/ Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/ shift	> 4 hours/ shift
Handheld grinders for Mortar Removal (i.e., tuckpointing)	<p>Use grinder equipped with Vacuum Dust Collection System. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p> <p>Proper handling of the handheld grinder is very important. Ensure the following occurs:</p> <ul style="list-style-type: none"> • Place one side of the shroud against the working surface before inserting the blade into the mortar joint. This directs the dust into the shroud as the blade cuts into the mortar joint. • Keep the shroud tight against the working surface. This cuts down on dust that would otherwise escape from the collection system. • Move the grinder counter to the direction of blade rotation to minimize escaping dust. • Back off the cutting pressure of the blade a short distance before removing it from the slot so the vacuum can have enough time to clear any dust buildup. • Do not move the grinder back and forth along the slot, as this will create a gap that increases dust escape. For better results, move the grinder in one direction, making a second pass only if necessary. • Use only enough cutting force to operate the tool effectively and keep the leading tool edge flush against the working surface. Do not leave a large gap between the shroud and uncut mortar. 	APF 10	APF25

WALK-BEHIND MILLING MACHINES AND FLOOR GRINDERS

Walk-behind Milling Machines and Floor Grinders	<ul style="list-style-type: none"> • Use tool equipped with integrated water delivery system that supplies water to cutting surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. 	None	None
	<p>Or</p> <ul style="list-style-type: none"> • Use machine equipped with Vacuum Dust Collection System and hood or shroud recommended by the manufacturer with enough suction to capture dust at the cutting point 	None	None

OSHA REGULATIONS—DRY GRINDING AND CUTTING

Table 1 Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

HANDHELD POWER SAWS, RIG-MOUNTED CORE SAWS OR DRILLS			
Equipment/ Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
Handheld Power 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
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. None • When used indoors or in an enclosed area.	None APF 10	None APF 10
Rig-Mounted Core Saws or Drills	• Use tool equipped with integrated water delivery system that supplies water to cutting surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Stationary Masonry Saws	None	None
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

Additional information on dust control methods

Vacuum Dust Collection System (VDCS)

Commercially available VDCSs have been shown to reduce silica exposures. The VDCS must include a:

- Hood or shroud that is recommended by the tool manufacturer.
- Vacuum that is recommended by the tool manufacturer with enough suction to capture dust at the cutting point.
- Filter with a 99 percent or greater efficiency in the vacuum exhaust and a filter cleaning mechanism.
- Vacuum exhaust hose capable of providing the airflow recommended by the tool manufacturer.

Proper Operation

Commercially available VDCSs have been shown to reduce silica exposures. Proper operation includes:

- Keeping the vacuum hose clear and free of debris, kinks and tight bends.
 - Turning the vacuum off and on regularly to reduce dust buildup on the filter, if it is not self-cleaning.
 - Changing vacuum-collection bags as needed or at least as often as recommended by the manufacturer.
 - Avoiding exposure to dust when changing vacuum bags and cleaning or replacing air filters.
 - Setting a regular schedule for maintenance as recommended by the manufacturer.
-

New Update!

Housekeeping Methods in October, 2017, OSHA communicated interim enforcement guidance which also clarified the use of sweeping compounds (e.g., non-grit, oil- or wax-based) as an acceptable dust suppression housekeeping method.

Note on wet cutting

Operating tools and machines with integrated water delivery systems (wet cutting) may produce slurry that can present additional hazards not covered in the Silica Rule. The use of specialized slurry vacs or other methods of consolidation are recommended. See an Associate for details.

Electrical safety

Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.



Indoors or in enclosed spaces

Using wet methods or a VDCS indoors or in an enclosed area may not reliably keep exposure low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- 1 Exhaust trunks
- 2 Portable exhaust fans
- 3 Air ducts
- 4 Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.



Use of compressed air:

Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing or filters because it can increase exposure to silica. Instead, clean with a HEPA filter-equipped vacuum or by wet methods.





APF	If you are referring to OSHA 29 CFR 1926.1153 Table 1		Find your APF	
	If you are doing an objective or scheduled assessment		Find your MUC	
10	Disposable Respirators and Half Face Reusable Respirators			
25	PAPRs and M-307 Respiratory Hardhat			
	50			
	Full Face Reusable Respirators (With quantitative fit test)			
1000	PAPRs and M-407 Helmet			
	50 mg/m3			
	Abrasive Blasting			



W-8100B



TR-600



M-407



GVP PAPR



TR-300



FF-6800



FF-400



TR-600



M-307



GVP PAPR



TR-300



8200



8511



6500QL



[**Return to Home Page**](#)