

Silica Safety

BY KATHLEEN DOBSON



Kathleen Dobson (kdobson@alberici.com) is safety director with Alberici Constructors.

SINCE THE 1930s, the U.S. Department of Labor has been studying the relationship between silica dust and worker deaths. (Visit tinyurl.com/silicasafety to see a 1938 news reel of Frances Perkins, the first woman to head Occupational Safety and Health Administration—OSHA—introducing the hazards of silica.)

In 1971, OSHA put a standard in place for silica, limiting worker exposure to an average of 250 micrograms per cubic meter over eight hours. And now, after further research and discussion, an updated silica standard for construction has recently gone into effect, limiting respirable crystalline silica exposure to workers to an average of 50 micrograms per cubic meter of air over eight hours.

On September 23, 2017, 29 CFR 1926.1153, the respirable crystalline silica standard (www.osha.gov), became enforceable for employers in the construction industry. For construction contractors involved in activities that generate respirable crystalline silica dust, including blasting, grinding, cutting or otherwise working on materials such as concrete, brick and stone, it means a much stricter standard for respirable crystalline silica dust control.

What's important, and generally overlooked, is that contractors may be required to comply with the new standard if their workers are working *around* airborne crystalline silica produced by *other contractors*. For example, if an erector is working downwind from a contractor dry-cutting a concrete slab and is exposed to the dust cloud, the erector's employer is required to have a respirable crystalline silica program in place. As such, construction employers, including those working with steel, should evaluate the appropriateness of a silica safety program for their workers.

Employers who do not comply with the requirements of the new silica standard could receive financial penalties from OSHA. Serious or other-than-serious penalties could be up to \$12,934 each—and repeat offenses or violations deemed by the agency to be willful in nature are subject to financial penalties of up to \$129,336 each.

Silica dust, a common hazard in concrete and masonry construction, faces new regulations to curb worker exposure that may peripherally affect on-site steel construction.

Employer Requirements

Employers will initially need to determine how much respirable crystalline silica dust workers are exposed to. If a viable sampling study indicates exposure levels below 25 micrograms, then the employer is not required to implement a silica program.

However, if the sampling study indicates exposure levels at or above 25 micrograms, then the employer is required to implement a written plan, provide medical surveillance and documentation and implement relevant engineering controls to effectively reduce the amount of respirable crystalline silica workers are exposed to. Most contractors anticipate that they will have many activities related to concrete work that will place the company in the level where they are required to have a comprehensive plan. Steel erectors will work around others or occasionally have tasks that expose them to silica. Steel fabrication facilities may have occasions where workers could be exposed.

OSHA's Table 1 (shown on the next page) also shows exposure control techniques for common construction tasks. If the table is followed regarding dust control techniques, respirators and a respirator program may not be required for silica exposures, and viable sampling studies will not be required.

FAQs

Here are answers to some frequently asked questions about silica:

Will everyone need a respirator?

No. See if your tasks fall under Table 1 (there are 18 common construction activities) and determine how long each task will take. Most tasks in Table 1 require a respirator with an assigned protection factor (APF) of 10.

If I give a worker a filter mask (like an N-95 or N-100) will I be covered? Not necessarily. Filter masks are still respirators. Workers need to know how to wear them, when to exchange them and if they are properly fitting. There is no qualitative or quantitative fit test for this type of res-

pirator, but there are instructions for testing seals (on the packaging) that a worker should follow every time they use one.

Also, OSHA considers any respirator use (including the filter masks) worn for silica exposure to be a part of our silica exposure plan. If a worker wears any type of respirator for 30 days (and OSHA considers a day's wear to be of any duration, whether it's 15 minutes or 8 hours) during a year, the worker must be medically evaluated once the 30-day threshold is met. This includes:

- A health history
- A physical exam (chest x-ray, pulmonary function test and TB skin test)

Costs will vary, but it is estimated that every worker undergoing a medical evaluation will be between \$250 and \$500, or more. Additional costs for fit-testing half-face respirators also need to be considered.

The workers wearing respirators must be tracked to maintain compliance with the standard.

At this time, we understand that the use of any respirator, including the dust masks, means our workers must be clean shaven; anything other than that is still to be determined.

What changes can be made to tools to reduce silica dust? Manufacturers who produce concrete tools have protective measures in place: filter systems, water systems, vacuum systems and so on. Many of the tools we currently use cannot be retrofitted and will not meet the standard requirements. Contact your company safety team for support and contact your manufacturer representative for training in the use of the new tools.

If tools incorporate wet methods, are other measures needed? Yes. You cannot assume that wetting down will be effective. If a manufacturer's tool has a wet method incorporated into the tool and it is used with water—and it reduces exposure to the permitted level—then that eliminates the need for other compliance testing and respirator use.

We don't have a full-time safety representative on our project. Who is the competent person? The project's compe-

tent person is:

- Someone who is on-site all the time
- Someone who knows the essential elements of the silica standard
- Someone who can enforce the rules with self-performed work and subcontractor's work
- Someone who can assure that personnel understand the standard if they are working around activities that produce respirable crystalline silica dust

If you aren't certain who to designate, make sure you contact the safety department for further direction.

Is this going to add costs to projects?

Yes. Employers will be responsible for: training employees; assuring they have the correct tools (respirators, tools with integrated water systems and tools with integrated HEPA vacuum systems); and assuring that personnel who need medical evaluations are identified and receive the evaluations per the standard. Project leaders and estimators need to understand there will be additional costs.

If our subcontractors are performing concrete work that produces respirable crystalline silica, what do we need to do?

Make certain they are following the standard and are not exposing your workers or any other subcontractor workers to respirable crystalline silica exposure. Failure to assure that subcontractors are complying may mean that OSHA will cite the general contractor for failing their controlling contractor responsibilities. Remember: Citations now begin at \$12,934 per each maximum penalty violation.

In addition, OSHA's *Crystalline Silica Standard for Construction* and *Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for Construction*, both available at www.osha.gov, are documents every shop and project should have and reference.

Understanding and following the requirements of this new silica standard will help you keep your employees safe and also help keep your company from becoming vulnerable to infraction-related fines. ■

OSHA's "Specified Exposure Control Methods" table is on the next page. ▶

Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica

Required respiratory protection and minimum assigned protection factor (APF)

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)		
			≤ 4 hrs/ shift	>4 hrs/ shift
(i) 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
(ii) 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:	-When used outdoors -When used indoors or in an enclosed area	None APF 10	None APF 10
(iii) 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
(iv) 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
(v) Drivable saws	For tasks performed outdoors only: 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
(vi) 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		None	None
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with 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 and a filter-cleaning mechanism Use a HEPA-filtered vacuum when cleaning holes		None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism		APF 10	APF 10
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector		None	None
	OR Operate from within an enclosed cab and use water for dust suppression on drill bit		None	None
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:	-When used outdoors -When used indoors or in an enclosed area	None APF 10	None APF 10
	OR Use tool equipped with commercially available shroud and 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 and a filter-cleaning mechanism:	-When used outdoors -When used indoors or in an enclosed area	None APF 10	None APF 10
(xi) Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and 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		APF 10	APF 25

Required respiratory protection and minimum assigned protection factor (APF)

Equipment/task	Engineering and work practice control methods		≤ 4 hrs/ shift	>4 hrs/ shift
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR Use grinder equipped with commercially available shroud and 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:	-When used outdoors -When used indoors or in an enclosed area	None None None	None None APF 10
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions OR Use machine equipped with dust collection system recommended by the manufacturer Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes		None None	None None
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions		None	None
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust Operate and maintain machine to minimize dust emissions For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust Operate and maintain machine to minimize dust emissions OR Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant Operate and maintain machine to minimize dust emissions		None None None	None None None
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points) Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station		None	None
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab OR When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions		None None	None None
(xviii) 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