Quality & Safety

SILICA-DUST RULE 101

What you need to know to keep your workers safe and be OSHA compliant.

PROCORE | ConstructionOS

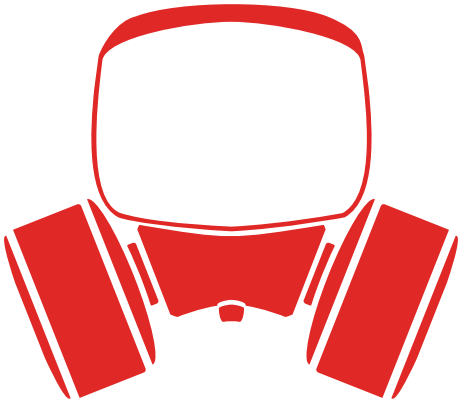
Table of Contents

If you're in the dark about what the new silica-dust rule means for you, you're not alone.

The new standard is by far one of OSHA's most comprehensive and complex health and safety regulations to hit the construction industry in years.

"What we're seeing is not anything close to what folks had anticipated," said Kevin Cannon, the director of safety and health for AGC of America. "The biggest thing is still trying to sort it out. Even some of the larger companies are still trying to figure it out."

As confusing and intimidating as the new regulation may seem, there are some basic and concrete steps you can take to become OSHA compliant and ensure your workers stay healthy and safe.



I. You Make Me Sick: The Dangers of Inhaling Silica Dust

One of the worst cases of acute silicosis, a disease caused by inhaling silica dust, occurred in the 1930s during the construction of the Gauley Bridge tunnel at Hawk's Nest, West Virginia. Some 2,000 tunnel workers drilled and blasted through high-silica rock with no protection.

More than 1,000 men are believed to have died as a result of inhaling silica dust. Workers died so quickly that they were reportedly buried in a cornfield in an attempt to cover up the severity of the tragedy.

Hawk's Nest is considered one of the worst industrial disasters in American history. It prompted a congressional investigation into the dangers of silicosis in the workplace.

SILICOSIS' DEVASTATING AFTERMATH

Fast forward nearly a century later, and silicosis continues to kill and leave devastated families coping with the aftermath.

For Tom Ward, a brick and stone mason from Michigan, silicosis' impact could still be felt more than 30 years later. His father died of the disease at the age of 39, after working as a sandblaster. Ward testified about the delays in OSHA's silica standard before the Senate Committee on Health, Education, Labor and Pensions in 2012. Here is a part of that testimony:

"When I was 13 my father died of silicosis. In his 20s, I remember he worked as a sandblaster for five to six years...I do remember going to work with my dad a couple of times. I remember old rusty truck frames coming in to be blasted and primed, the effort he put into his job, his work ethic...After he left his job sandblasting, he took a job where he was represented by the Teamsters' Union, he had good pay and benefits that my family relied on. A few years into his new job, he started getting short of breath. We got the official diagnosis—silicosis—when he was 34 years old.

The hardest memory to live with is the last day he worked. He came in the door, fell to the floor and started crying. He said, 'I can't do it anymore.'...it took five years for silicosis to kill him. It was a slow and very painful process for me, my sisters and for my mother to witness. In the end, his disease suffocated him."

It would be another four years, following this hearing and many subsequent others, before the new OSHA silica standard rule would be put into place.

SILICOSIS: THE SILENT KILLER

The industrial material is crystalline silica and it's all around us, especially in rocks and sand. Most of us know it as quartz, which accounts for 12 percent of the earth's crust. If it's pretty much everywhere, how can it be so bad?

When left alone, silica behaves nicely. But when it's disrupted, that's when the real trouble starts.

Anytime you drill, cut, crush and grind silica, the cloud of dust you see contains microscopic particles known as respirable crystalline silica—each of which is about 100 times smaller than a grain of sand. When it is inhaled, respirable crystalline silica can wreak havoc on your lungs and lead to debilitating and potentially deadly diseases, such as silicosis (an incurable lung disease), lung cancer, and kidney disease.

Since 2000, silicosis is responsible for the deaths of more than than 2,000 Americans, according to the Centers for Disease Control. That number is higher on an annualized basis than the number of fatal accidents from coal mining—one of the country's most dangerous jobs.

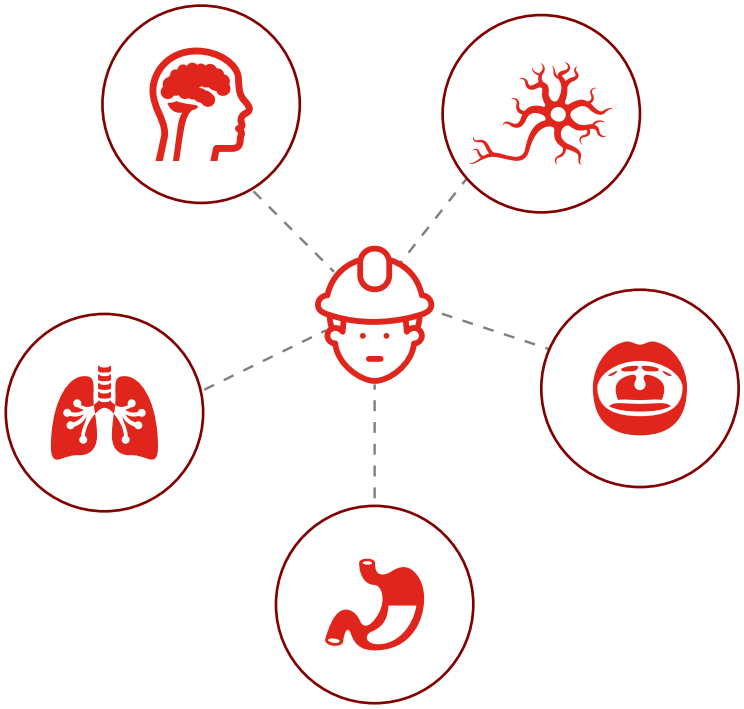
Every day, some 2.3 million workers are exposed to crystalline silica. With the new rule in place, OSHA expects to save the lives of 600 workers and prevent more than 900 cases of silicosis each year.

ONE OSHA HEALTH EXPERT DESCRIBES THE PROGRESSION OF SILICOSIS THIS WAY: "TAKE A STRAW ABOUT THE DIAMETER OF A DIME AND TRY TO DRAW AIR FROM THE STRAW. AND AS TIME PROGRESSES, SHRINK THE DIAMETER OF THE STRAW AND THEN PUT A BAG OVER YOUR HEAD, BECAUSE YOU SLOWLY SUFFOCATE."

The majority of workers develop silicosis in their 30s, however, there are little to no symptoms in the early stages of the disease. Depending on the level of silica dust exposure, silicosis can develop within months of intense dust exposure or it can go undetected by chest x-ray for 10 years or more, following low-level exposure.

Here are some symptoms to look out for:

+ Shortness of breath
+ Loss of appetite
+ Chest pain
+ Persistent cough and/or wheezing
+ Fatigue



II. The New Legal Limit and What it Means for You

Beginning September 23, the permissible exposure limit (PEL) will be 50 micrograms of respirable crystalline silica per cubic meter of air averaged over an eight-hour workshift—down from 100 micrograms.

What is PEL?

It's the exposure limit a worker is legally allowed to breath. The way to calculate the PEL is by three factors: air, dust, and time. As an owner/contractor, superintendent, project, quality or safety manager, the PEL is extremely important not only for OSHA compliance purposes, but for the health and safety of your workers.

Measuring the PEL can be done through air sampling methods that are sent to a lab. The cost of air sampling is about $100. If you would rather forgo the air monitoring route, you can follow the steps outlined in Table 1 (in the next chapter).

In addition to controlling the dust levels, there are several mandatory provisions an employer must follow to remain OSHA compliant:

+ Employers must use engineering controls, such as water or ventilation, to limit worker exposure.
+ Provide respirators when levels exceed PEL.
+ Implement a written exposure control plan.
+ Communicate silica hazards and provide worker training on silica risks and how to avoid exposure.
+ Provide medical exams to workers who will need to wear a respirator for 30 or more days a year.

III. I've Got It Under Control: Basic Steps to Become OSHA Compliant

Industry insiders highly recommend that everyone, from owners and superintendents to project managers and foreman, read the silica rule regulation to better understand its context and scope.

1. CREATE AN EXPOSURE CONTROL PLAN

The OSHA standard requires that you create an exposure control plan for your workers explaining the dangers of crystalline silica, identify the materials and the type of work that exposes them to silica dust, and list the equipment and controls needed to keep the silica dust levels at or below the PEL.

2. USE OSHA'S TABLE 1 FOR EXPOSURE CONTROL METHODS

Table 1 of the regulation serves as a template for mapping out your exposure controls and work practices. The table lists 18 tasks that create harmful silica dust, the tools used for each, and the type of equipment needed to stay below the PEL. For example, if your workers are using a handheld power saw, they need to be equipped with an integrated water delivery system that supplies a continuous stream of water to the blade. The table also tells you whether a respirator is required. Following the table will protect your workers and ensure OSHA compliance.

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)	
		< 4hrs/ shift	> 4hrs/ shift
(iii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuosly feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instruction to minimize dust emissions. + When used outdoors. + When used indoors and in an enclosed area.	None APF 10	APF 10 APF 10

AIR MONITORING AS A SECOND OPTION

There is a second alternative for meeting OSHA compliance which allows you to do your own air monitoring to measure the PEL (referred to as "exposure assessment"). This is only required for construction firms whose specific tasks are not listed in Table 1—where employers do not fully implement the engineering controls and work practices, or choose not to follow the Table 1 route.

This option can be tedious and requires numerous steps. As mentioned earlier, to determine the PEL you need to factor in air, dust, and time. For instance, you will need to figure out the breathing rate for each specific worker. To determine that, you will need to take their size, fitness level and the specific task into account. And that's only for the air measurement.

If your company decides to go the second route, there are several options available that include silica air sampling analysis that meet the OSHA standard and can be found in Appendix A of the regulation.

TRAINING TOOLKIT

Everyone on your jobsite who is directly and indirectly involved with tasks that produce silica dust are required to have training. Experts advise that the training be kept simple and to the point. However, it should contain all the vital information needed to protect them and their coworkers and stay below the PEL.

HERE'S WHAT TRAINING SHOULD EXPLAIN:

- Materials and tasks that produce silica
- Silica dust health risks
- How to work safely with silica, including proper use of equipment and tools
- The company's silica exposure control plan.

IV. Frequently Asked Questions

Q. DO I NEED A RESPIRATOR?

A. That depends on the type of work being performed and whether vacuuming or wetting down the silica dust isn't enough to provide substantial protection. If that's the case, your worker will need a respirator. But it's not a one-size fits all solution. Does the wearer have facial hair? How long will he or she be performing the work? Does the respirator meet OSHA's assigned protection factor (APF)? Does the respirator need to be specially fitted?

Before you go out and buy a respirator mask, industry experts strongly recommend you call a manufacturer, like 3M and explain the job tasks and what you need to be OSHA compliant. A simple mask versus specially-fitted respirators can range from $3 to $1,000.

Q. IF I BLOW MY NOSE AFTER BREATHING SILICA DUST AM I SAFE?

A. No. If you breathe in silica dust particles they will pass through your nose and mouth and into your lungs. The dust that you're seeing in your nose and mouth is coarser and doesn't pass through—it's the silica dust that you don't see that is hazardous.

Q. WHAT ARE THE FINES FOR A SILICA DUST VIOLATION?

A. If past fines are any indication, they could be costly. In 2014, OSHA fined a Nebraska stone-cutting facility $41,000 for exposing workers to dangerous silica dust levels. That same year, the agency also penalized an iron foundry $50,600 for unsafe exposure levels.

Q. WHO IS RESPONSIBLE FOR MAKING SURE YOU STAY UNDER THE PEL?

A. Everyone. As a contractor/owner, safety manager and superintendent, it's important to educate and provide training for your team, but it's also critical to follow up with your subcontractors to ensure they are OSHA compliant.

V. Impact on Small to Medium Sized Businesses

Purchasing the required equipment and incorporating new work practices can be expensive. It is unknown what the actual cost will be to small and medium sized businesses. To offset the impact, OSHA has staggered the dates for small construction firms to give them some extra time. The agency also created the Small Entity Compliance Guide that is tailored for the small business owner.

STILL, EXPERTS SAY THAT SPENDING THE MONEY ON TOOLS THAT CAPTURE AND/OR WET THE DUST NOT ONLY SAVE LIVES, BUT ALSO SAVE COMPANIES VALUABLE TIME AND MONEY.

"The silica rule is raising awareness of the small to medium sized businesses to change their work practices," said Joel Guth, an advisory member on the Cal/OSHA Respirable Silica committee. "If you eliminate the dust you generate on the job you don't have to spend two or three hours cleaning it up."

There is a wide gap of disparity between OSHA's estimates and the construction industry's assumption of the economic impact this new regulation will have. The agency estimates the construction industry will have to spend $511 million annually to implement the new rule industry, but experts say the cost is more likely to be $5 billion.

Due to the regulation's considerable scope and complexity, it is anyone's guess as to whether or not OSHA will come down hard with enforcement or hold off until businesses become more knowledgeable about the regulation.

In the meantime, experts strongly urge everyone affected by the new standard to get themselves and their workers as familiar with the new regulation as possible. Reach out to makers of respirators and vacuums, like 3M and Bosch, for insight about what type of equipment your workers need.

The new silica dust standard is here. Preparing yourself is no longer something that can be put off until tomorrow.

APPENDIX

LINKS AND WEB RESOURCES

A valuable source for anything and everything silica related: **silica-safe.org**

Tool for creating a silica control plan: **http://plan.silica-safe.org/**

Air sampling analysis: **galsonlabs.com/**

Power tools for controlling silica dust: **https://iqpowertools.com/silica-dust/**

3M respirators: **http://www.3m.com/3M/en_US/safety-centers-of-expertise-us/respiratory-protection/respirator-selection/**

Bosch dust collection systems: **https://www.boschtools.com/us/en/more/news-and-extras/knowledge-center/dust-control/proguard-home/about_pro+guard/**

OSHA RESOURCES:

Silica regulation for construction work and Table 1: **https://www.osha.gov/silica/SilicaConstructionRegText.pdf**

Frequently asked questions about silica: **https://www.osha.gov/silica/Silica_FAQs_2016-3-22.pdf**

Silica fact sheet for construction industry: **https://www.osha.gov/Publications/OSHA3681.pdf**

Small Entity Compliance Guide: **https://www.osha.gov/Publications/OSHA3902.pdf**

Methods for sampling analysis: **tps://www.osha.gov/silica/AppendixAtosect1926.1153.pdf**

PROCORE

PRODUCED BY

Procore Technologies, Inc.

Procore Technologies, Inc., the world's most widely used construction management software, helps construction firms simplify their processes with an easy-to-use, mobile-enabled platform providing unlimited user licenses and renowned customer support. Understanding the industry's unique needs, Procore's user-centric product development ensures more efficient project, quality, and financial management, helping companies increase collaboration, build times, and profit.

For more information or a free demonstration visit www.procore.com.

Talk with an Expert

Visit The Jobsite >
Procore's Hub for Original Content

Watch Procore TV >
Procore's Official YouTube Channel

More Resources >
Free eBooks & Downloads

If you have any questions, please give us a call at 1.866.477.6267 or email us: sales@procore.com