

OSHA's Proposed Crystalline Silica Rule: General Industry and Maritime

OSHA is proposing two standards to protect workers from exposure to respirable crystalline silica—one for general industry and maritime, and the other for construction—in order to allow employers to tailor solutions to the conditions in their workplaces.

About 320,000 workers are currently exposed to respirable crystalline silica in general industry and maritime workplaces. Some of the affected industries are shown below.

Number of Workers Exposed to Respirable Crystalline Silica in Selected General Industry/ Maritime Sectors		
Industry sector	Number of workers currently exposed	Number of workers currently exposed above proposed PEL
Asphalt Roofing Materials	4,395	1,963
Concrete Products	54,449	19,204
Cut Stone	12,085	7,441
Dental Laboratories	41,194	1,329
Foundries	48,223	24,658
Jewelry	10,508	4,600
Porcelain Enameling	5,545	1,932
Pottery	10,148	4,777
Railroads	16,895	5,629
Ready-Mix Concrete	43,920	32,110
Shipyards	4,550	3,250
Structural Clay Products	8,435	4,377
Support Activities for Oil and Gas Operations	25,440	16,056

Source: OSHA Directorate of Standards and Guidance

The proposed rule is expected to save nearly 700 lives and prevent 1,600 new cases of silicosis per year once the full effects of the rule are realized. Of these, over 130 lives would be saved and over 540 cases of silicosis would be prevented among general industry and maritime workers.

Major Provisions of the Proposed General Industry/Maritime Standard

The proposed standard for general industry and maritime includes provisions for employers to:

- Measure the amount of silica that workers are exposed to if it may be at or above an **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 **permissible exposure limit (PEL) of 50 µg/m³**, averaged over an 8-hour day;
- **Limit workers' access** to areas where they could be exposed above the PEL;
- Use **dust controls** to protect workers from silica exposures above the PEL;
- Provide **respirators** to workers when dust controls cannot limit exposures to the PEL;
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers exposed above the PEL for 30 or more days per year;
- **Train workers** on work operations that result in silica exposure and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.

Examples: Dust Control Methods

In most cases, dust controls can be used to limit workers' exposure to silica. Examples of effective dust controls are shown below. These technologies are widely available and already commonly used by many employers.

Wet methods

This worker is using a saw with a built-in system that applies water to the saw blade. Wet methods are a common way to limit the amount of dust that gets into the air.



Ventilation

This worker is grinding castings in a foundry. The work is done in a ventilated



booth that draws air away from the worker so he doesn't breathe the dust created by the grinding. This method can be used in material handling (such as bag dumping), mixing operations, rock crushing, and other dust-producing activities.

Enclosures

This worker is using an enclosure while abrasive blasting dental castings in a dental laboratory. Enclosures create a barrier between the worker and the source of exposure. This can be done by methods such as:

- Enclosing an operation in an airtight housing;
- Covering conveyors and transfer drums used to move silica-containing materials so that silica dust doesn't get in the air; or
- Separating workers from the activity, such as when workers are in enclosed cabs.



Additional Information

You can learn more about OSHA's proposed rule, including opportunities to participate in development of the rule, by visiting OSHA's Silica Rulemaking webpage at www.osha.gov/silica.

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OSHA's Proposed Crystalline Silica Rule: Overview

Workers who inhale very small crystalline silica particles are at increased risk of developing serious silica-related diseases. These tiny particles (known as “respirable” particles) can penetrate deep into workers’ lungs and cause silicosis, an incurable and sometimes fatal lung disease. Crystalline silica exposure also puts workers at risk for developing lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease (COPD), and kidney disease.

To improve worker protection, OSHA is proposing two new crystalline silica standards: one for general industry and maritime, and the other for construction. The proposals are based on extensive review of scientific evidence, current industry consensus standards, and OSHA’s outreach, including stakeholder meetings, conferences, and meetings with employer and employee organizations.

OSHA encourages the public to participate in this rulemaking. Information on submitting comments on the proposed rule and participating in public hearings can be found at www.osha.gov/silica. Your input will help OSHA develop a final rule that adequately protects workers, is feasible for employers, and is based on the best available evidence.

Why is OSHA proposing a crystalline silica rule?

OSHA’s current permissible exposure limits (PELs) for crystalline silica were adopted in 1971 and have not been updated since that time. They do not adequately protect workers; they are outdated, inconsistent and hard to understand.

- Strong evidence shows that current PELs do not adequately protect worker health. The current PELs are based on research from the 1960s and earlier and do not reflect more recent scientific evidence. For example, since the current PELs were adopted, the U.S. National Toxicology Program, the International Agency for Research on Cancer, and the National Institute for Occupational Safety and Health have all identified respirable crystalline silica as a human carcinogen.
- The current PELs are formulas that are difficult for many employers to understand; the PELs for construction and shipyards are based on a method for measuring worker exposures that has not been commonly used for more than 40 years.

- The current PELs for construction and shipyard workers allow them to be exposed to risks that are over twice as high as for workers in general industry. The proposed rule would provide consistent levels of protection for workers in all sectors covered by the rule.

How will the proposed rule protect workers?

The proposed rule is expected to prevent thousands of deaths from silicosis, lung cancer, other respiratory diseases, and kidney disease. OSHA estimates that the proposed rule will save nearly 700 lives and prevent 1,600 new cases of silicosis per year once the full effects of the rule are realized.

“In the absence of effective specific treatment for silica-related diseases, the only approach remains primary prevention, i.e., control of exposure to respirable silica.”

Official Statement of the American Thoracic Society on the Adverse Effects of Crystalline Silica Exposure

Who would be affected by the proposed rule?

About 2.2 million workers are exposed to respirable crystalline silica in their workplaces. The majority of these workers, about 1.85 million, are in the construction industry. Exposures occur when workers cut, grind, crush, or drill silica-containing materials such as concrete, masonry, tile, and rock. About 320,000 workers are exposed in general industry operations such as brick, concrete, and pottery manufacturing, as well as operations using sand products, such as foundry work and hydraulic fracturing (fracking) of oil and gas wells. Workers are also exposed during sandblasting in general industry and maritime workplaces.

What would the proposed rule require?

Workers' exposures would be limited to a new PEL of 50 micrograms of respirable crystalline silica per cubic meter of air ($\mu\text{g}/\text{m}^3$), averaged over an 8-hour day. The new PEL would be the same in all industries covered by the rule.

The proposed rule also includes provisions for measuring how much silica workers are exposed to, limiting workers' access to areas where silica exposures are high, using effective methods for reducing exposures, providing medical exams to workers with high silica exposures, and training for workers about silica-related hazards and how to limit exposure. These provisions are similar to industry consensus standards that many responsible employers have been using for years, and the technology to better protect workers is already widely available.

Lowering silica exposure can generally be accomplished by using common dust control methods, such as wetting down work operations to keep silica-containing dust from getting into the air, enclosing an operation ("process isolation"), or using a vacuum to collect dust at the point where it is created before workers can inhale it.



A worker using a grinder with an attached vacuum dust collection system. The vacuum pulls dust through the hose, where it is captured by filters. (Photo courtesy of the University of Washington)



A worker cutting concrete block using a handheld saw that applies water to the blade. The water reduces the amount of silica-containing dust that gets in the air.

What economic effects are expected?

The proposed rule is estimated to provide average net benefits of about \$2.8 to \$4.7 billion annually over the next 60 years. It is expected to result in annual costs of about \$1,242 for the average workplace covered by the rule. The annual cost to a firm with fewer than twenty employees would be less, averaging about \$550. The proposed rule is expected to have no discernible impact on total U.S. employment.

How can I learn more about the proposed rule?

Visit OSHA's Silica Rulemaking webpage at www.osha.gov/silica.

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OSHA's Proposed Crystalline Silica Rule: How You Can Participate

OSHA's notice-and-comment rulemaking process relies heavily on input from the public, including the regulated community and other stakeholders. OSHA encourages members of the public to participate in the silica rulemaking by submitting comments on the proposal and by providing testimony and evidence at the informal public hearings that the Agency will hold after the comment period ends.

What opportunities are there for participation?

OSHA's Notice of Proposed Rulemaking (NPRM) on Occupational Exposure to Crystalline Silica was published in the *Federal Register* on September 12, 2013 so that members of the public can review it and submit comments during the public comment period. The proposed rule is available on the *Federal Register* web page at <https://federalregister.gov/a/2013-20997>. You can find supporting documents on OSHA's Silica Rulemaking web page at www.osha.gov/silica.

OSHA has scheduled public hearings to allow interested persons to make oral presentations on the issues raised in the proposed rule. The hearings are informal administrative proceedings convened for the purpose of

gathering and clarifying information. They are overseen by an administrative law judge. Following the public hearings, OSHA will publish a transcript of the hearings and make it available to the public in the rulemaking docket.

How will my participation impact the rulemaking?

OSHA reviews and analyzes all the material in the public rulemaking record in order to determine if and how it should proceed with rulemaking. The Agency makes its decisions based on the evidence in the rulemaking record as a whole. If OSHA issues a final rule, the preamble to the final rule would discuss significant issues raised in comments and testimony received on the proposal.

How can I review the materials submitted to OSHA?

All testimony, comments, and other materials submitted to the rulemaking docket are or will be listed online at www.regulations.gov (Docket ID# OSHA-2010-0034); however, some information (e.g., copyrighted material) is not publicly available to read or download through that website. All submissions to the docket, including copyrighted material, are available for inspection and, where permissible, copying at the OSHA Docket Office, U.S. Department of Labor, Room N-2625, 200 Constitution Avenue, NW, Washington, DC 20210.

How do I participate in the public hearings?

The public hearings will begin on Tuesday, March 18, 2014, in the auditorium of the U.S. Department of Labor's Frances Perkins Building, 200 Constitution Avenue, NW, Washington, DC, 20210, and will conclude on Friday, April 4, 2014.

The [hearing schedule](#) provides the dates each participant will testify and be available for questions. The [hearing procedures](#) provide detailed information about how the hearing will be conducted.

Members of the public are welcome to attend to listen to testimony from OSHA, its expert witnesses, and other interested parties. Those members of the public who filed a timely written notice of intention to appear can also ask questions of agency officials and other witnesses during the hearing.

How do I submit post-hearing comments and briefs?

After the close of the public hearings, members of the public who filed a timely written notice of intention to appear prior to the hearings will be able to submit additional comments. Evidence and data relevant to the proceeding must be submitted within 45 days of the close of the hearing. Final briefs, arguments, and summations must be submitted 90 days after the close of the hearing. Post-hearing comments and briefs can be submitted by:

- Visiting the Federal e-Rulemaking Portal at www.regulations.gov, Docket ID# OSHA-2010-0034.
- Faxing OSHA's Docket Office at 202-693-1648 (for comments of 10 pages or less).
- Sending hard-copy documents (via regular mail, express delivery, courier, or hand delivery) to the OSHA Docket Office, Technical Data Center, Room N-2625, OSHA, U.S. Department of Labor, 200 Constitution Avenue, NW, Washington, DC 20210.

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OSHA[®] FactSheet

OSHA's Proposed Crystalline Silica Rule: Information for Small Businesses

OSHA's proposed rule to protect workers from exposure to respirable crystalline silica will offer small employers the flexibility to tailor solutions that fit their workplaces.

The Harmful Impact of Silica

About 2.2 million workers are exposed to **respirable crystalline silica**: tiny particles, small enough to inhale and damage workers' lungs. Most of these at-risk workers—about 1.85 million—are in the construction industry. Exposure occurs during construction activities when workers are cutting, grinding, crushing, or drilling into materials that contain silica like concrete, masonry, tile and rock. Workers who manufacture brick, concrete, and pottery are also often exposed, as well as workers in operations using sand products, such as foundry work and sandblasting.

Exposure to crystalline silica causes silicosis, an incurable but preventable lung disease. Exposure also causes lung cancer and other lung diseases, as well as kidney disease. OSHA expects the proposed standard to save close to 700 lives and prevent more than 1,600 cases of silicosis each year once the full effects of the rule are realized.

Small businesses and their employees in industries like dental laboratories, foundries, and construction work are directly affected by the proposed rulemaking. Roughly 1.3 million workers are exposed to silica in about 470,000 small businesses. This includes 580,000 employees in about 356,000 very small businesses of fewer than 20 workers each.

A Voice for Small Businesses

OSHA strongly encourages small businesses to participate in the rulemaking process by providing comments and taking part in public hearings. Information on submitting comments on the proposed rule and participating in public hearings can be found at www.osha.gov/silica. Your input will help OSHA develop a final rule that adequately protects workers and makes sense for small employers.

From the beginning of the development of the proposed rule, OSHA recognized the importance of small businesses concerns. Early in the process, the agency met with representatives from small businesses in construction, general industry and maritime to identify ways to:

- Simplify the proposed rule so it would be easier to understand;
- Identify ways to minimize burdens on employers while still protecting workers; and
- Make sure small businesses would have enough time to meet a new rule's requirements.

Two groups of small business representatives (one for construction, one for general industry and maritime) examined these and other considerations as part of the Small Business Regulatory Enforcement Fairness Act (SBREFA) process. SBREFA provides small businesses with an important voice in developing proposed rules so that before the agency officially proposes a new standard, the voice of small business has already made a big impact on the process.



Flexible Alternatives for Businesses

OSHA is seeking input from small employers and others on the burden, costs, feasibility and practicality of the proposed rule. OSHA is proposing two different standards to protect workers from crystalline silica—one for construction and one for general industry and maritime. This will enable employers to tailor solutions to the conditions in their own workplaces.

To meet the needs of the construction industry, OSHA is proposing a flexible alternative that would allow employers to identify appropriate dust controls for a given task by referring to a table in the standard. This approach simplifies compliance and eliminates the need for measuring workers' exposures to silica, while still ensuring adequate protection for workers.



The proposed general industry standard also offers employers significant flexibility, allowing them to limit worker exposures to the permissible exposure limit (PEL) by using any dust control or work practice method—such as water sprays, dust collectors, enclosed cabs on equipment, or prohibiting activities such as dry sweeping—that delivers the necessary protection, rather than specifying which steps an employer must take.

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"In today's climate we stress to our customers safety, financial stability, company stability ... We remind our men we want them to come home in the same shape, or better shape than when they showed up to work that morning."

— Bill Holmeier, Branch Manager, Western Construction Group; St. Louis, MO

The exposure limits in both standards protect workers better than the antiquated exposure limits issued in 1971. The new limits, based on simple, conventional weight measures, make it easier for employers to determine if worker exposures are at or below the permissible level.

Other provisions extend the balanced approach, minimizing burdens on employers while still ensuring sufficient worker protections. For example, the rule would generally require monitoring of exposures only two to four times a year, depending on silica levels measured during initial monitoring. That frequency would be sufficient for employers to determine if their exposure controls are working and enable workers to know about their exposures.

Based on the most recent economic analysis, OSHA estimates that:

- The proposed rule would provide average net benefits of about \$2.8 to \$4.7 billion annually over the next 60 years;
- The average cost of compliance for an establishment in general industry would be about \$2,600 per year, and for construction, about \$1,000;
- The cost to a firm with fewer than 20 employees would average about \$550 a year; and
- The new rule would have no discernible impact on total U.S. employment.

Additional Information

You can learn more about OSHA's proposed rule, including opportunities to participate in development of the rule, by visiting OSHA's Silica Rulemaking webpage at www.osha.gov/silica.

OSHA's Proposed Crystalline Silica Rule: Construction

OSHA is proposing two standards to protect workers from exposure to respirable crystalline silica—one for construction, and the other for general industry and maritime—in order to allow employers to tailor solutions to the conditions in their workplaces.

About 1.85 million workers are currently exposed to respirable crystalline silica in construction workplaces. Over 640,000 of these workers are estimated to be exposed to silica levels that exceed OSHA's proposed permissible exposure limit (PEL).

These exposures occur during common construction operations such as: Using masonry saws; using hand-operated grinders; tuckpointing; using jackhammers; using rotary hammers or drills; operating vehicle-mounted drilling rigs; milling; rock crushing; drywall finishing using silica-containing material; and use of heavy equipment during earthmoving.

The proposed rule is expected to save nearly 700 lives and prevent 1,600 new cases of silicosis per year once the full effects of the rule are realized. Of these, over 560 lives would be saved and about 1,080 cases of silicosis would be prevented among construction workers.

Major Provisions of the Proposed Construction Standard

The proposed standard for construction includes provisions for employers to:

- Measure the amount of silica that workers are exposed to if it may be at or above an **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;
- **Limit workers' access** to areas where they could be exposed above the PEL;
- Use **dust controls** to protect workers from silica exposures above the PEL;

- Provide **respirators** to workers when dust controls cannot limit exposures to the PEL;
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers exposed above the PEL for 30 or more days per year;
- **Train workers** on work operations that result in silica exposure and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.

Example: Dust Controls in Construction

The most common methods of limiting silica exposures in construction tasks are wet methods, where water is used to keep silica-containing dust from getting into the air, and vacuum dust collection systems, which capture dust at the point it is made.



This rotary hammer has a built-in vacuum dust collection system. The drill bit is surrounded by a shroud that is attached to a vacuum to collect dust and bits of concrete. (Photo courtesy of DeWalt)

Flexible Alternatives for Construction

The proposed standard also provides flexible alternatives, especially useful for small employers. Employers can choose to measure their workers' exposure to silica and independently decide which dust controls work best in their workplaces. Alternately, employers can simply use a control method laid out in Table 1 of the proposed construction standard.



Using a stationary masonry saw without dust controls can expose workers to high levels of silica. Table 1 provides a simple explanation of what employers can do to keep their workers safe. (Photo courtesy of CPWR)

Table 1 matches common construction tasks with dust control methods that can be used to limit worker exposures to silica, so employers know exactly what they need to do for every job and every worker. The dust control measures listed in the table include methods that are known to be effective, like using water to keep dust from getting into the air or using ventilation to capture dust. In some operations, respirators may also be needed. If an employer chooses to use a method in Table 1, they would not need to measure workers' exposure to silica.

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Example of a Flexible Alternative for Construction: Protecting Against Dust from Stationary Masonry Saws

You can use a saw with a built-in system that applies water to the saw blade. The water limits the amount of dust that gets into the air.

The employer wouldn't need to measure the amount of dust in the air, but if a worker used the saw for more than four hours per day, they would also need a half-mask respirator. If a worker used the saw for four hours or less per day, no respirator would be needed. If any worker needs to use a respirator 30 or more days a year, he or she would need to be offered a medical exam.

Table 1. Exposure Control Methods for Selected Construction Operations

Operation	Engineering and Work Practice Control Methods	Required Air-Purifying Respirator (Minimum Assigned Protection Factor)	
		≤ 4 hr/day	> 4 hr/day
Using Stationary Masonry Saws	Use saw equipped with integrated water delivery system. (Plus additional specifications)	None	Half-Mask (10)

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