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OSHA'S NEW SILICA RULE

Understanding the rule
and having a plan can keep workers safe.

Silica dust is hazardous when small particles are inhaled. These dust particles can penetrate deep into the lungs and cause disabling—sometimes fatal—lung diseases, including silicosis and lung cancer as well as kidney disease.

Silicosis was listed as the underlying or a contributing cause of death on more than 1100 death certificates from 2005 through 2014 in the United States (Centers for Disease Control and Prevention, 2016).

Most deaths from silicosis, however, go undiagnosed and unreported. Likewise, the number of silicosis deaths do not include additional deaths from other silica-related diseases such as COPD (chronic obstructive pulmonary disease), lung cancer, and kidney disease.

While the number of silicosis cases has declined over the past several decades, more workers died from silicosis in 2014 than in fires or being caught in or crushed by collapsing materials like trench and structure collapses (Bureau of Labor Statistics, 2014).

According to the Occupational Safety and Health Administration, about 2.3 million people in the United States are exposed to silica at work. To address occupational exposure to respirable crystalline silica that can be inhaled or breathed in, OSHA has promulgated new silica standards that significantly reduce the amount of silica dust workers can be exposed to on the job.

Understanding the major provisions of OSHA's new Silica Rule is the first step towards compliance and protecting the health of workers.

What Is Silica?

Silica is a compound composed of silicon and oxygen (SiO_2) and exists in crystalline and amorphous (having no distinct form or shape) states, both in the natural environment and as produced during manufacturing or other processes.

Quartz is the most common form of crystalline silica and accounts for almost 12% by volume of the earth's crust. Quartz accounts for the overwhelming majority of naturally found silica and is present in varying amounts in almost every type of mineral. Thus, quartz is the most prevalent form of crystalline silica found in the workplace.

Cristobalite is a relatively rare form of crystalline silica—associated with volcanic activity. Cristobalite can be created during some processes conducted in the workplace. Quartz converts to cristobalite at a temperature around 2700°F. Around 3100°F, cristobalite loses its crystalline structure and becomes an amorphous fused silica.

Note that OSHA's new silica standard applies to exposure to respirable crystalline silica, not amorphous silica.

Industry Uses

There are more than 30 major industries and operations where exposures to crystalline silica can occur. They include diverse workplaces such as foundries, dental laboratories, concrete products, and paint and coating manufacturing. Crystalline silica exposure also applies to construction activities including drilling, grinding, and using heavy equipment during demolition activities involving materials containing silica.

Exposures to crystalline silica dust occur in common workplace operations involving the following types of operations:

- Earth drilling (operations involving disturbance of the earth's crust)
- Cutting, sawing, drilling, and crushing concrete, brick, rock, and stone (construction tasks)
- Operations using sand products (hydraulic fracturing, glass manufacturing, sandblasting).

Sand and gravel are used in road building and concrete construction. Sand with greater than 98% silica is used in the manufacture of glass and ceramics. Silica sand is used to form molds for metal castings in foundries and abrasive blasting operations. Silica is also used as a filler in plastics, rubber, and paint, and as an abrasive in soaps and scouring cleansers.

In hydraulic fracturing for oil and gas recovery, silica sand is used to filter impurities from municipal water and sewage treatment plants. It is also used to manufacture artificial stone products used as bathroom and kitchen countertops—where the silica content in those products can exceed 85%.

Major Provisions of OSHA's New Silica Rule

OSHA promulgated two separate standards that address occupational exposure to respirable crystalline silica. The one applies to exposures in general industry (29 CFR 1910.1053). The other applies to exposures in the construction industry (29 CFR 1926.1153).

The two standards are similar with some differences to account for the different work activities, anticipated exposures, and other conditions. The major provisions of OSHA's Silica Rule and the differences between the two standards are summarized here.

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Scope and application: The new Silica Rule applies to all occupational exposures to respirable crystalline silica in construction work, except where employee exposure will remain below 25 micrograms per cubic meter (25 $\mu\text{g}/\text{m}^3$) of air.

Permissible exposure limit: 50 $\mu\text{g}/\text{m}^3$

Action level: 25 $\mu\text{g}/\text{m}^3$

Exposure assessment: Any combination of exposure monitoring data or objective data may be used to accurately characterize exposures to crystalline silica.

A reassessment of exposures is required whenever there has been a change in the production process, control equipment, personnel, or work practices that may reasonably be expected to result in new or additional exposures to respirable crystalline silica at or above the action level (25 $\mu\text{g}/\text{m}^3$)

At construction work sites, the employer is not required to assess the exposures of employees engaged in the tasks or take additional measures to ensure exposures do not exceed the permissible exposure limit (50 $\mu\text{g}/\text{m}^3$) where the employer has fully and properly implemented the engineering controls, work practices, and respiratory protection prescribed in the standard for specified tasks.

Exposure monitoring: If the scheduled exposure monitoring option is used to assess exposure, monitoring must be performed:

- Initially
- Every three months if greater than or equal to the permissible exposure limit

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- Every six months if greater than or equal to the action level.

Discontinue if less than the action level, and subsequent exposure monitoring taken at least seven days later confirms exposure is less than the action level.

Employee notification: Results of the exposure assessment must be posted, or each affected employee must be notified in writing, within:

- Fifteen working days after completing an exposure assessment (general industry)
- Five working days after completing an exposure assessment (construction).

The employee notification must describe the corrective action being taken to reduce employee exposure to or below the permissible exposure limit.

Written exposure control plan: Is required and must contain at least the following elements:

- Description of the tasks involving exposure to respirable silica
- Description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task
- Description of the housekeeping measures used to limit employee exposure to respirable crystalline silica
- For construction work sites, a description of procedures used to restrict access to work areas, when necessary, must also be included to minimize the number of employees exposed to respirable crystalline silica and

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their level of exposure, including exposures generated by other employers.

Competent person: Someone designated for construction work sites who has the responsibility to implement the written exposure control plan. A competent person as defined by OSHA is: “An individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.”

Regulated areas: Must be demarcated when reasonably expected to be in excess of the permissible exposure limit. Signs marked “DANGER” must be posted at all entrances to regulated areas.

This provision applies to general industry work sites, but does not apply to construction work sites. However, the silica standard for construction requires the exposure control plan include procedures to restrict access to work areas to minimize the number of employees exposed to respirable crystalline silica.

Methods of compliance: Feasible engineering controls must be implemented to reduce exposures to or below the permissible exposure limit. When it is not feasible to do so, the employer must reduce exposures to the lowest achievable levels and supplement such engineering and work practice controls with respiratory protection.

Specified exposure control methods: The construction standard specifies 18 tasks and prescribes the engineering controls, work practices, and respiratory protection for each task.

The employer is not required to perform an exposure assessment or limit exposures when engaged in these specified tasks—provided the employer has fully and properly implemented the engineering controls, work practices, and respiratory protection as specified for these tasks in the construction standard.

OSHA permits employers of general industry to follow the construction standard rather than the general industry standard when the tasks specified in the construction standard are indistinguishable from the tasks performed at the general industry work site. This option is permitted by general industry employers only when the tasks are not performed regularly in the same environment and conditions—for example, maintenance and repair tasks.

Housekeeping: Dry sweeping or dry brushing is not allowed unless wet sweeping, HEPA-filtered vacuuming, or other methods minimizing the likelihood of exposure are not feasible. Compressed air shall not be used to clean clothing or surfaces where such activity could contribute to exposure to respirable crystalline silica unless effective local exhaust ventilation is used or there is no feasible alternative method.

Medical surveillance: For general industry work sites, medical surveillance examinations shall be made available to employees who will be occupationally exposed to respirable crystalline silica at or above the action level for 30 or more days per year.

For construction work sites, medical surveillance examinations shall be made available to employees who are required to use a respirator for 30 or more days a year.

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Hazard communication: Employees must have access to labels on containers of crystalline silica and safety data sheets. Workers must receive training in the following silica hazards: cancer, lung effects, immune system effects, and kidney effects.

Recordkeeping: The following record documents must be maintained:

- Exposure monitoring data
- Objective data
- Medical surveillance records.

Compliance Dates

OSHA's new Silica Rule became effective June 23, 2016, but employers have been given time to comply with the new standards. Employer obligations for construction were given one year to comply with the standard, establishing an effective compliance date of June 23, 2017, except for the laboratory analysis provisions of the standard, which has a compliance date of June 23, 2018.

The compliance date for general industry is June 23, 2018. Some additional delays for the compliance dates are provided for complying with the medical surveillance requirements and implementing feasible engineering controls for hydraulic fracturing operations in the oil and gas industry.

The effective date for complying with the medical surveillance provisions of the standard for general industry is June 23, 2018 if exposed at or above the permissible exposure limit for 30 or more days per year. The compliance date is June 23,

Take in Webinar on Crystalline Silica Rule

The National Ground Water Association will have a webinar titled "OSHA's New Final Rule on Crystalline Silica." It will take place January 19, 2017, from 12-1 p.m. ET and be led by Jerome Spear, CSP, CIH, author of this column.

The webinar will provide an overview regarding recognizing, evaluating, and controlling the potential hazards of crystalline silica and the major provisions of the Occupational Safety and Health Administration's new rule. Find out more information at www.NGWA.org/Events-Education.

2020 if exposed at or above the action level for 30 or more days per year. The effective date for complying with the provisions for implementing feasible engineering controls for hydraulic fracturing operations is June 23, 2021.

OSHA estimates the new silica standards will save the lives of more than 600 workers and prevent more than 900 cases of silicosis each year, once the full effects of the rule are realized. [WWJ](#)

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