

December: MIOSHA Facts Crystalline Silica Exposure

Construction and General Industry

Crystalline silica is a basic component of soil, sand, granite and many other minerals.

Quartz is the most common form of crystalline silica.

Cristobalite and tridymite are two other forms of crystalline silica.

Exposure occurs during many different construction and general industry activities.

The most severe exposures generally occur during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures and other surfaces.

Other construction activities that may result in severe exposure include jack hammering, rock/well drilling, concrete mixing, concrete drilling, brick and concrete block cutting and sawing, tuck pointing and tunneling operations.



Health Effects Associated with Inhalation of Respirable Crystalline Silica

Health effects from silica exposures include:

- Lung cancer
- Silicosis, a disabling, irreversible and sometimes fatal lung disease
- Other non-malignant respiratory diseases, such as chronic bronchitis
- Kidney disease, including nephritis and end-stage renal disease

To a lesser extent, there is cause for concern that silica exposures may be associated with auto-immune disorders and cardiovascular disease.

Permissible Exposure Limits and Other Provisions of the Standard

The MIOSHA construction standard and general industry standard establishes a permissible exposure limit (PEL) for respirable crystalline silica of 50 micro-grams of respirable crystalline silica per cubic meter of air (50 $\mu\text{g}/\text{m}^3$) calculated as an 8-hour time-weighted average (TWA), and an action level of 25 $\mu\text{g}/\text{m}^3$ calculated as an 8-hour TWA. In addition to the exposure limits, the standard includes provisions to protect employees such as requirements for exposure assessment, methods for controlling exposure, respiratory protection, medical surveillance, hazard communication and recordkeeping.

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Requirements

The standard requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. The standard provides flexible alternatives, especially useful for small employers. Employers can use a control method, they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures to the PELs in their workplaces.

Regardless of which exposure control method is used, all employers covered by these standards are required to:

Establish and implement a written exposure control plan that identifies:

- Tasks that involve exposure and methods used to protect workers,
- Including procedures to restrict access to work areas where high exposures may occur.
- Designate a competent person (construction only) to implement the written exposure control plan.
- Where feasible, prohibit housekeeping practices that generates an uncontrolled release of silica dust and contributes to employee exposure.
- Offer medical exams—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year (Construction). General Industry requires medical exams when employees are exposed over the Action Level for 30 days per year.
- Train workers on work operations that result in silica exposure and ways to limit exposure.
- Keep records of workers' silica exposure and medical exams

General industry employers may follow the construction standards if the task will not be performed regularly in the same environment and conditions. This would be considered a non-routine task. Otherwise, the general industry employer shall assess the exposure of each employee who is or may be reasonably expected to be exposed to respirable crystalline silica at or above the Action Level.

For routine job tasks (general industry) that have exposures to silica, air monitoring is required. If the initial air monitoring is below the Action Level the employer may discontinue monitoring of the represented employees for that exposure. If exposures are at or above the Action Level then a sampling schedule, dictated by the standard must be followed until two consecutive measurements, taken 7 or more days apart are below the Action Level. If the exposures are at or above the Action Level, the sampling will be repeated every six months; more frequent air monitoring is required when exposures are above the PEL. Employers are expected to follow the hierarchy of controls (engineering, work practices, followed by PPE).

The employer must use engineering controls regardless of feasibility.



References: MIOSHA and OSHA