

# MIOSHA Fact Sheet

## Crystalline Silica Exposure in 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, non-reversible 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 respirable silica exposures may be associated with auto-immune disorders and cardiovascular disease.

### Permissible Exposure Limits and Other Requirements of the Standard

MIOSHA Construction Standard [Part 690, Silica in Construction](#) (Part 690) and General Industry Standard [Part 590, Silica in General Industry](#) (Part 590) establish a permissible exposure limit (PEL) for respirable crystalline silica of 50 micrograms 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 standards include provisions to protect employees such as requirements for exposure assessment, methods for controlling exposure, respiratory protection, medical surveillance, hazard communication, and recordkeeping.

The standards require employers to limit worker exposures to respirable crystalline silica and to take other required steps to protect workers. The standards also provide flexible alternatives, especially useful for small employers. Employers can either use a control method laid out in Table 1 of Part 690, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures to respirable crystalline silica in their workplaces.

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

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- 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 generate an uncontrolled release of silica dust that contribute to employee exposure.
- Offer medical exams, including chest X-rays and lung function tests, every three years for construction workers who are required by the standard to wear a respirator for 30 or more days per year. Employers not in construction must have medical exams for employees when they are exposed over the action level for 30 or more days per year.
- Train workers on work operations that result in silica exposure and ways to limit the exposure. Employee training on the health hazards associated with exposure to respirable crystalline silica is also required. This employee training must address cancer, lung effects, immune system effects, and kidney effects.
- Keep records of employee silica exposure and medical exams.

General industry employers may follow the construction rules found in Table 1 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 must 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 in general industry facilities 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. 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, which begin with engineering, followed by work practices, and finally by personal protective equipment. The employer must use engineering controls regardless of feasibility.

## Resources

Resources are available on the MIOSHA website at [www.michigan.gov/miosha](http://www.michigan.gov/miosha), in the “MIOSHA Initiatives” section, click on “[Silica](#).”

For additional information visit the National Institute for Occupational Safety and Health (NIOSH) website at: [www.cdc.gov/niosh/silica](http://www.cdc.gov/niosh/silica). The Federal Occupational Safety and Health Administration (OSHA) topic page for crystalline silica ([www.osha.gov/silica-crystalline/construction](http://www.osha.gov/silica-crystalline/construction)) includes a series of Fact Sheets for controlling silica dust during specific operations like masonry saws, drill rigs, milling machines, and tuckpointing. Federal OSHA has also published two small entity compliance guides for respirable crystalline silica for [Construction](#) (OSHA Publication No. 3902) and [General Industry](#) (OSHA Publication No. 3911).

## Additional Assistance

MIOSHA’s Consultation Education and Training (CET) Division can provide and assist with more information on crystalline silica exposure as well as safety and health training. You may contact the CET Division at 517-284-7720 or online at [www.michigan.gov/cet](http://www.michigan.gov/cet). CET may also be available to employee groups and other organizations. Call to request help.