



Crystalline Silica

Crystalline silica is a naturally occurring substance used in a wide variety of industries and construction operations such as the production of cement, sandblasting operations, the production of glass and ceramics and as a filter for water and sewage treatment. It is also a common additive in food and pharmaceutical applications and is used in the production of fiber optic cables. While silica has many valuable uses, it can also present a danger when workers are exposed to excessive amounts of crystalline silica dust. In fact, each year there are hundreds of deaths and thousands of illnesses attributed to harmful exposures to silica dust. To prevent these types of harmful exposures, OSHA has developed regulations for general industry, maritime operations and the construction industry. The following are some key requirements from these regulations as well as some safe work practices that employees can follow to protect themselves from harmful exposure to crystalline silica.

CHARACTERISTICS & PROPERTIES

- Anytime you hear the term respirable crystalline silica, it is referring to silica dust that can be inhaled into your lungs.
- Some operations that generate respirable crystalline silica include cutting, drilling, or grinding any type of material that contains silica.
- Also, employees working in manufacturing processes that utilize silica, such as glass manufacturing or foundries may also be exposed to respirable crystalline silica.
- This type of potentially harmful silica dust can be so small that it cannot be seen with the naked eye. Therefore it is so important to always take proper precautions in order to avoid harmful levels of exposure.

EFFECTS OF EXPOSURE

- Crystalline silica is classified as a carcinogen of the lungs. A carcinogen is a substance that has the potential to cause cancer.
- As workers inhale tiny silica particles over time, they are at increased risk of developing serious, and often deadly, silica-related illnesses.
- In addition to lung cancer, another disease associated with the inhalation of silica dust is silicosis. Chronic silicosis, also known as classic silicosis, is a fibrotic lung disease that typically occurs after many years of low to moderate exposures to silica dust.
- Silicosis causes scar tissue to form in the lungs and as the disease progresses, the victim may experience shortness of breath during exercise and have clinical signs of poor oxygen/carbon dioxide exchange.



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- In severe cases, silicosis can be disabling or even fatal due to respiratory failure. There is no known cure for silicosis.
- A less common form of silicosis is acute silicosis. This form of silicosis occurs after exposures to very high concentrations of silica. Symptoms include severe, disabling shortness of breath, weakness and weight loss. Acute silicosis often leads to death.
- Breathing in silica dust has also been linked to the acceleration or severity of such diseases as tuberculosis, emphysema, kidney diseases, chronic bronchitis and chronic obstructive pulmonary disease, or COPD.

REGULATIONS/RESPIRATORY PROTECTION

- OSHA has set the permissible exposure limit, often called the PEL, of crystalline silica to be 50 micrograms of respirable crystalline silica per cubic meter of air averaged over an eight-hour workday.
- OSHA regulations require organizations to use engineering and work practice controls as the primary means to limit worker exposure to respirable crystalline silica to below the permissible exposure limit of 50 micrograms per cubic meter of air.
- When engineering and work practice controls cannot adequately limit exposure, then the OSHA regulations require that employers provide appropriate respiratory protection to reduce exposure to permissible levels.
- For many job tasks, a simple N-95 NIOSH certified respirator will provide the necessary protection from silica dust. If other types of respirators are selected, be sure that the filter is certified for silica dust and that the respirator has an assigned protection factor of at least 10.
- Some job tasks, such as sandblasting operations, subject the worker to larger exposures and additional hazards. Sandblasting and similar operations require the use of a type CE positive pressure abrasive blasting respirator.
- If you have any questions about the proper respiratory protection required for any specific job task, be sure to ask your supervisor.
- The OSHA standards also require that regulated areas be established to limit employee access to areas where exposures exceed the permissible exposure limit. The posting of warning signs at the entrances to regulated areas is required.

WORK PRACTICE CONTROLS

- In addition to these types of engineering controls, work practice controls can also be used to limit exposure. Work practice controls refer to actions that employees can take while working to reduce exposure to silica dust.



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- For example, good housekeeping practices are essential in reducing the risk of exposure. Build ups of dust should be removed with a water hose or by wet sweeping to prevent creating airborne dust.
- Another option is to use a vacuum with a high-efficiency particulate filter, known as a HEPA filter, to clean up silica related areas.
- You should strive to avoid using compressed air or dry sweeping these areas. These methods disperse dust particles into the air and dramatically increase the potential for exposure.
- Other work practice controls include the use of disposable work clothes when working around silica-containing materials and to shower and change into clean clothes before heading home.

TABLE 1 OF THE CONSTRUCTION REGULATION

- The construction industry presents many challenges when it comes to air monitoring employee exposure to silica dust. For this reason, the OSHA construction regulation includes a specific table titled “Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica.”
- Commonly called “Table 1”, this useful table matches common construction tasks with OSHA’s recommended silica dust control methods.
- Table 1 of the construction regulation contains three columns of information. The first column lists the equipment to be used or the task to be performed; the second column lists the appropriate engineering and work practice controls that should be in place; and, column three specifies if respiratory protection is required and if so, what type.
- When Table 1 is correctly followed, construction workers will not be exposed to harmful levels of silica dust.