

Crystalline Silica and Vault Manufacturing

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About 2.3 million people in the U.S. are exposed to silica at work. Crystalline silica is a common mineral found in the earth's crust. Materials like sand, stone, concrete, and mortar contain crystalline silica. It is also used to make products such as glass, pottery, ceramics, bricks, and artificial stone. Breathing in very small "respirable" crystalline silica particles causes a variety of serious diseases. Silicosis, an incurable lung disease, can lead to disability and death. Respirable crystalline silica also causes lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease. Exposure to respirable crystalline silica is related to the development of autoimmune disorders and cardiovascular impairment. These occupational diseases are life-altering and debilitating disorders that annually affect thousands of workers across the United States. If you work in a vault manufacturing facility that uses concrete, crystalline silica is likely an issue at your facility and the new respirable crystalline silica regulations may affect you.

Concrete is a product that presents a high risk of exposure to crystalline silica. Concrete is a composite material composed of fine and coarse aggregate bonded together with fluid cement that hardens over time. Your raw materials likely include sand, cement, and aggregates, such as pea gravel. Sand and cement, and possibly your aggregates, can contain high levels of crystalline silica that can become respirable. There are several areas of typical vault manufacturing that are likely to put you at risk of exposure.

Receipt and storage of raw materials

Sand and cement become easily airborne when transporting and dumping. Storage is an issue if these products are exposed to any wind. Cleaning out a storage pit can create significant risks in addition to being in a confined space.

Mixing concrete

Ingredients must be moved and mixed to create concrete. When these ingredients are moved by a conveyor they can easily become airborne. Dumping these ingredients into the mixer also creates a dust cloud that likely contains respirable crystalline silica.

Pouring into molds and form removal

Wet concrete does not pose a risk as the water prevents the silica from becoming airborne. However, after the concrete is poured, there is typically some overflow that gets onto the mold or spills onto the floor. It is also likely that concrete debris drops onto the floor when molds are opened. Dry concrete on the molds or floor can become airborne as crystalline silica dust.

Finishing

If you perform any sanding, etching, fitting or other finishing operations on dry concrete, this also can release hazardous silica dust into the air. This dust can be breathed by anyone in the area, and can settle onto surfaces that can be disturbed later.

Facility cleanup, floor dry compounds

Facility cleanup of dried concrete and dust also poses exposure risks. Many floor dry compounds contain crystalline silica that can become airborne when sweeping or even when someone walks on it.

So what do you need to do to protect your employees?

Do a Hazard Assessment

Every safety program begins with hazard assessment. Check your safety data sheets to see which of your materials contain silica. Identify all work tasks that could release respirable crystalline silica and determine who can be exposed. Consider not only those performing the work tasks where exposure is likely, but also others who may be in the exposure area.

Measure levels

Unless there is objective data that shows airborne crystalline silica in your environment cannot be at or above the action level, you must measure levels wherever exposure could occur. Action level means a concentration of airborne respirable crystalline silica of 25 µg/m³, calculated as an 8-hour TWA. OSHA and NIOSH have published methods for measuring concentrations of respirable crystalline silica. If your measurements are at or above the action level, you must take further steps to protect your employees.

Make the environment safe

If your employees could be exposed at or above the action level, you must eliminate unsafe conditions. The first choice is always to eliminate any procedures that are not essential to the work to be performed, or substitute with less hazardous materials/procedures whenever possible. For example, use floor dry products that do not contain silica.

Implement Engineering Controls

After eliminating as many unsafe conditions as possible, the new rule requires that employers use engineering controls to reduce workers' exposure to silica dust. Engineering controls include wetting down work operations or using local exhaust ventilation (such as vacuums) to keep silica-containing dust out of the air and out of workers' lungs. Another control method that may work well is enclosing an operation.

Establish Safe Work Practices

Work practices are the methods and procedures used to perform tasks. Develop safe work practices for all tasks that involve hazards. Examples of work practices to control silica exposures include wetting down dust before sweeping.

Use respirators

Respirators are only allowed when engineering and work practice controls cannot maintain exposures at or below the PEL. Respirators are not as protective as engineering controls, and they aren't always as practical. Respirators must be selected for each worker, individually fitted, periodically refitted, and regularly maintained. Filters and other parts must be replaced as necessary. Any glitch in this program will result in continued exposure to silica. Even when respirators are selected, fitted, and maintained correctly, they must be worn consistently and correctly by workers to be effective. Respirators can also be uncomfortable, especially in hot weather, and cannot be used by workers without the approval of a licensed healthcare professional.

Medical Surveillance

Each employee who will be occupationally exposed to respirable crystalline silica at or above the action level for 30 or more days per year must be provided with medical surveillance. The purpose of medical surveillance is to determine if an employee has any condition, such as a lung disease, that might make him or her more sensitive to respirable crystalline silica exposure, to identify adverse health effects associated with respirable crystalline silica exposure so that appropriate actions can be taken, and to determine the employee's fitness to use respirators. The information gained through medical surveillance can help guide employees to take actions to improve their health, such as making job choices to reduce exposures, wearing a respirator for extra protection, or making personal lifestyle or health decisions, such as quitting smoking or getting flu shots.

Train Employees

Training is the backbone of any safety program. Each employee must be trained on how silica can affect their health, their specific risks of exposure at their job, and your plan to protect them.

Visit www.technetrain.net to see what is happening with OSHA in your industry. We have a full line of training programs and employer guides to help you with OSHA compliance. Contact TechneTrain, Inc. at (800) 852-8314 for more information.