

Silica, it's everywhere!



The Respiratory Protection **Brand.**





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No matter what industry you work in, your age or the country you live, you will have been in contact with silica regularly. Silica, also known as quartz sand, is derived from the earth's crust and is the most significant component that makes up the continental crust that we live on. As a material in its natural form, this is not hazardous, and we cannot avoid being exposed to it because it's everywhere we walk. However, when silica turns to a dust form known as crystalline silica, as a result of grinding, sawing, and drilling products like cement, mortar, plastics and glass, the dust particles can make their way into our respiratory system which exposes us to a host of health issues.

Those that work in the construction industry are at higher risk of exposure according to the Center for Disease Control (CDC). It is estimated around 2 million workers in the US alone are exposed to silica with 100,000 of those workers in high risk environments such as abrasive blasting, foundry, stone cutting, rock drilling and tunneling. As with most respiratory health issues in industrial workplaces, the effects are not obvious and have a cumulative effect. Workers often do not know that their work is potentially causing serious health issues that will affect them later in life, and this can be fatal.

What are the health effects of silica exposure?

There are a range of health issues associated with silica exposure from mild to severe. When crystalline silica enters the respiratory system, it causes permanent lung damage. The lung tissue reacts to the silica particles by developing fibrotic nodules and scarring around the trapped particles. When the nodules grow larger, this causes breathing to become difficult. These can lead to silicosis, lung cancer, chronic obstructive pulmonary disease (COPD) and kidney disease.

Silicosis is the most common disease to develop as a result of scar tissue forming which makes it difficult to breathe. Moderate exposure to crystalline silica usually takes around 15-20 years of occupational exposure to develop. This time frame can be accelerated to less than 10 years through high level of silica exposure, which is known as accelerated silicosis. In worst case scenarios, acute silicosis can develop within just weeks or up to 4-5 years when there is exposure in extremely high concentrations.

As silicosis develops, operators can experience inflammation of the lungs, fluid buildup in the lungs, fever and sharp chest pains, all of which reduces the lungs capacity to function. This can result in the need for breathing assistance, lung transplants and dramatic lifestyle changes in order to minimize the effects of this disease. In cases where this does not reduce the effects, this can be fatal. The damage caused by silica is permanent, and there is no treatment or cure.

As with silicosis, lung cancer forms from the scarring of the tissue caused by the particles as they enter the respiratory system. This is the result of abnormal cells multiplying in the lungs to form tumors. There is research that indicates that silica exposure can also increase the risk of developing esophageal, stomach and skin cancer.

COPD covers several diseases that affect the lungs. The two most common are emphysema and chronic bronchitis. The tiny air sacs in the lungs, known as alveoli, become damaged with emphysema. With chronic bronchitis, inflammation of the lining occurs in the bronchial tubes that carry air to and from the alveoli. The result, shortness of breath, wheezing and coughing. Like silicosis, the effects of this are irreversible and can worsen. With medication and management, this can be maintained for better quality of life.

What responsibility do employers have?

Occupational Safety and Health Administration (OSHA) are the governing body that creates and implements safety standards across all industries. It is the employer's legal obligation and duty to adhere to these standards for the protection of their workers and to avoid extensive citations and fines.

In the construction industry, the permissible exposure limit (PEL) is 50 µg/m³. This means the workers should not be exposed to more than 50 micrograms of silica per cubic meter of air averaged over an eight-hour work shift.

In addition to this, employers must have a written plan that is implemented to minimize silica exposure and employees must be provided training for this also. Employers need to provide their workforce with pulmonary function tests and chest x-rays every 3 years.

How can you prevent silica exposure?

The key message with silicosis and the other health issues associated is these are 100% preventable. It may not be feasible to remove silica from the worksite, but there are steps that can be put in place such as changes in practice, materials used and respiratory protective equipment that can ultimately save lives.

Ways to reduce exposure:

- **Alternative materials:** If possible, seek materials that do not contain crystalline.
- **Don't wear work clothes at home:** The clothes you wear on the job can carry the silica dust you have operated in. If not possible, then vacuuming the dust is an alternative option.
- **Water spray:** Spraying the materials helps to keep dust at a minimum.
- **Use a local exhaust ventilation (LEV):** A LEV vacuums up dust closest to its source, reducing the spread of airborne particles.
- **Don't touch your face:** When you know silica dust is present, don't eat, drink or smoke. Wash your hands and face before you do any of the above.

One of the greatest advancements in PPE is the creation of powered air purifying respirators. These provides operators with a greater level of respiratory protection than tight-fitting negative pressure face masks. Their portability and positive air pressure assists those with breathing difficulties and with higher APF, operators can be confident that they are being kept safe, breathing clean, filtered air that does not contain silica crystalline. Not only do these provide greater respiratory protection, they can also incorporate safety glasses, hearing protection and hard hat protection all in the same unit. Air that is passed to the users breathe zone can assist in cooling them also.

As the body of research for silica exposure grows, it is evident that significant changes need to be made in industrial practices. Silica exposure is a silent killer, taking years for the full effects to become apparent. Because the damage is not immediate, it is easy to become complacent with implementing safety practices at work. However, the long-term health impacts are devastating and most frightening of all, it's permanent with no cure. Now is the time to look after your lungs, protect yourself so you can be there for life's best moments.

Sources:

Chisholm, K. (2019, July 10). Everything You Need to Know About Silica in the Workplace. Retrieved from Hazmat School: <https://www.hazmatschool.com/blog/everything-need-know-silica-workplace/>

Coalition, M. E. (2020). Minerals Database. Retrieved from Mineral Education Coalition: <https://mineralseducationcoalition.org/minerals-database/silica/>

CPWR. (2020). Work Safely with Silica. Retrieved from The Center for Construction Research and Training: <https://www.silica-safe.org/know-the-hazard/what-are-the-health-effects/signs-symptoms>

CPWR. (2020). Frequently Asked Questions. Retrieved from The Center for Construction Research and Training: <https://www.silica-safe.org/ask-a-question/faq#question7>

EUROSIL. (n.d.). The European Association of Industrial Silica Producers. Retrieved from The European Association of Industrial Silica Producers: <https://www.eurosil.eu/13-what-are-main-uses-silica>

Murray, C. J. (2014, December 18). Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Retrieved from National Center for Biotechnology Information: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4340604/>

OSHA. (2002). "Crystalline Silica Exposure" Health Hazard Information for General Industry Employees. Retrieved from Occupational Safety and Health Administration: <https://www.osha.gov/Publications/OSHA3176.html>

Worksafe. (2020, January 13). Silica dust in the workplace. Retrieved from Worksafe: <https://worksafe.govt.nz/topic-and-industry/dust/silica-dust-in-the-workplace/>

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