



The dangers of breathing silica dust

What is silica?

Silica is the basic component of sand and rock. The best known and most abundant type of crystalline silica is quartz. Some common silica-containing materials include:

- Concrete, concrete block, cement, and mortar
- Masonry, tiles, brick, and refractory brick
- Granite, sand, fill dirt, and top soil
- Asphalt-containing rock or stone
- Abrasive used for blasting

Silica is so common that any workplace activity that creates dust can expose workers to airborne silica.

Are you exposed to silica dust?

If you do any of the following activities, you are at risk of breathing silica dust:

- Chipping, sawing, grinding, hammering, or drilling of rock, concrete, or masonry structures
- Crushing, loading, hauling, or dumping of rock
- Many building demolition processes
- Power cutting or dressing stone
- Façade renovation, including tuck-point work
- Abrasive or hydro blasting of concrete
- Clean-up activities such as dry sweeping or pressurized air blowing of concrete or sand dust
- Tunneling, excavation, or earth moving of soils with high silica content

What is silicosis?

Silicosis is a disease caused by the prolonged breathing of crystalline silica dust. Fine particles deposited in the lungs cause thickening and scarring of the lung tissue. Crystalline silica exposure has also been linked to lung cancer.

A worker may develop any of the following three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

- **Chronic silicosis** – develops after 10 or more years of exposure to crystalline silica at relatively low concentrations.
- **Accelerated silicosis** – develops 5 to 10 years after initial exposure to crystalline silica at high concentrations.
- **Acute silicosis** – symptoms develop anywhere from a few weeks to 4–5 years after exposure to very high concentrations of crystalline silica.

Initially, workers with silicosis may have no symptoms. However, as the disease progresses a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

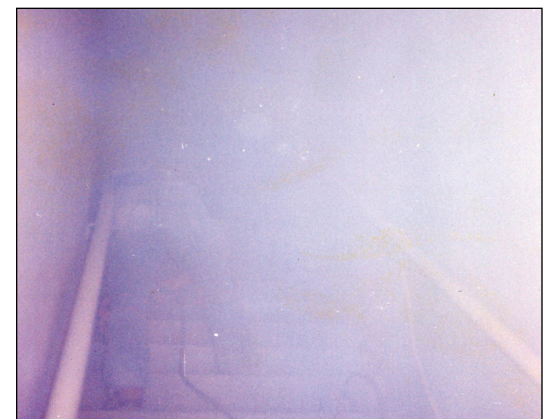
These symptoms can worsen over time and lead to death.



Rock drilling without dust controls.



Rock crushing without dust controls.



Worker grinding concrete in a stairwell without dust controls.

What can employers do to protect workers from silica dust?

- Change the material – Substitute crushed glass, olivine, or other material for silica sand in abrasive blasting.
- Change the process – Design buildings with pre-built recesses for plumbing, gas, and electric wiring so there is less need to cut or drill masonry and concrete.
- Provide engineering controls – Use local exhaust ventilation or water spray systems to reduce dust levels. Use barriers to restrict access by unprotected workers.
- Provide appropriate personal protective equipment (PPE) such as respirators and protective clothing.
- Train workers on the dangers of silica exposure, and how to use dust controls and PPE.
- Develop and implement an exposure control plan for silica. An effective plan must include purpose and responsibilities, risk assessment, controls, education, training, written safe work procedures, washing or decontamination facilities, health monitoring, and documentation.



Worker grinding concrete in a stairwell with local exhaust ventilation. Note the exhaust unit at the bottom of the stairs.

How can workers protect themselves?

If you are a worker exposed to silica dust, you can do the following:

- Learn about the control methods that can protect you.
- Ask your supervisor how you will be protected when performing dusty work.
- Follow safe work procedures, and use respiratory protection.
- Talk to your family doctor, who may recommend medical monitoring.

What is WorkSafeBC doing to help protect workers from silica exposure?

WorkSafeBC has an occupational exposure limit of 0.025 milligrams per cubic metre (mg/m³), which is the maximum amount of crystalline silica to which workers may be exposed during an eight-hour work shift. Crystalline silica is also classified as a human carcinogen, and exposures must be kept as low as reasonably achievable.

Exposure control plans are also required by the Occupational Health and Safety Regulation. An effective plan provides a detailed approach to protecting workers from harmful exposure to crystalline silica dust, including health hazard information, engineering controls, safe work procedures, worker training, and record keeping. Employers can use the sample exposure control plans (see the link below) as templates to develop their own plans, and add specific details regarding safe work practices for their operations. It is important to follow all the points outlined in the sample plans, or use equally effective measures.

More information and resources

For more information on the dangers of silica and how to prevent exposure, visit www2.worksafebc.com/Portals/Construction/HazardousMaterials.asp?ReportID=34096

Download toolbox meeting guides from www2.worksafebc.com/Portals/Construction/ToolboxMeetingGuides-Topic.asp?ReportID=34825

Download sample exposure control plans from www.worksafebc.com/publications/health_and_safety/by_topic/occupational_hygiene/default.asp#silica



Concrete drill with a HEPA filter attachment.



Worker grinding concrete using a HEPA vacuum exhaust attachment on the grinder.



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