Silica at the work site

OHS information for employers, supervisors, workers and physicians

Silica is found in many mineral deposits around the world, including Alberta. This bulletin introduces key properties, usages and health effects, and points to more information about legal requirements that will apply at work sites where silica may be present.

KEY INFORMATION

- Silica is a harmful substance. Over-exposure to silica can have serious health consequences.
- If silica is or may be present at your work site, health and safety requirements apply.
- Consult the *Occupational Health and Safety Act*, Regulation and Code to make sure you know and comply with all applicable requirements.

About silica

Silica is the scientific name for a group of minerals made of silicon and oxygen. Silica is found in most mineral deposits in the world in both crystalline and non-crystalline (amorphous) forms.

Crystalline silica occurs in several forms, including quartz, cristobalite and tridymite. Quartz is the most common form of crystalline silica. It is the crystalline form of silica that is the main concern when considering health effects.

Silica has many workplace uses. These include:

- Molds and cores used to make metal casting.
- Refractory brick used in kilns, foundries, power and cement plants.
- Filter media in water filtration systems.
- Sports and recreation use (for example, golf sand traps, or sand in playgrounds or riding arenas).
- Sandblasting abrasives.
- Glass, fibreglass, ceramics, paints, plastics, some building materials (such as concrete, grout or plaster).
- Components for electronics, fibre-optics, laser and time-keeping devices.
- Proppant for hydraulic fracturing in oilfield applications.

Health effects

Silica can cause silicosis and may contribute to lung cancer. Smoking increases the likelihood that an exposed worker will develop silicosis or lung cancer.

Research suggests there may also be an association between silica-related diseases and both infections and autoimmune diseases.

Silicosis

Silicosis is caused when respirable crystalline silica particles less than 10 microns in size are inhaled and deposited in the lung. The lung tissue reacts by developing fibrotic nodules and scarring around the trapped silica particles. If the nodules grow too large and if scarring is extensive, symptoms develop.

Silicosis can progress even after exposure to crystalline silica has ended. A person can progress from asymptomatic to having severe symptoms, including coughing, difficulty breathing and increased susceptibility to respiratory infections like pneumonia and tuberculosis.

Silicosis can be life-altering or fatal.

There are three types of silicosis.

- Chronic silicosis may develop due to ongoing exposure at relatively low concentrations over a long period of time (that is, 10 or more years).
- Accelerated silicosis can develop five to 10 years after a first exposure to high concentrations.
- Acute silicosis can develop after exposures to very high concentrations of airborne dust with high silica content. Symptoms usually appear within a few weeks to five years of the first exposure.

Lung cancer

Occupational exposure to respirable quartz and cristobalite can cause cancer. Quartz and cristobalite are classified as “Group 1, carcinogenic to humans”.

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Hazards from sandblasting

Sandblasting is a significant source of silica exposure. As well, sandblasting operations can pose an acute safety risk to the worker doing the blasting: specifically, from abrasive force that can be severe enough to cause life-threatening injuries including laceration and high-pressure tissue injuries.

> "If a worker is performing abrasive blasting, the employer must ensure that the worker wears personal protective equipment specifically designed for abrasive blasting, supplied with air that is at a positive pressure of not more than 140 kilopascals.
>
> OHS Code, Part 18, Section 255

OHS requirements

Eliminate the hazard if you can

Employers must eliminate a hazard if it's reasonably practicable to do so.

If you can't eliminate the hazard, OHS laws apply

If it's not possible to eliminate silica from the workplace, requirements in the Occupational Health and Safety (OHS) Code apply. Learn more in the Harmful substances in the workplace bulletin.

Note that employers must have a code of practice in place when silica is present at a work site above specific quantities. The Harmful substances in the workplace bulletin includes more information about this requirement, and a sample code of practice outline.

Additional requirements for controlling exposure to silica

Part 4 of the OHS Code puts additional requirements in place to control worker exposure to silica.

- Section 28 states that employers must:
  - Minimize the release of silica into the air.
  - Keep silica and waste materials containing silica from accumulating unnecessarily in work areas.
  - Ensure decontamination methods (for the work area, workers, equipment and personal protective equipment) prevent the generation of airborne silica.
- Section 29 sets out rules for restricted areas for silica work. These include rules about:
  - Authorized access.
  - Required signage (including signs that state eating, drinking and smoking are prohibited in the area).
  - Provision of personal protective equipment used as protective clothing, and ensuring workers' street clothing isn't contaminated.
  - Decontamination before leaving the restricted area.
  - Workers leaving the restricted area for a health and safety emergency.

> **RESTRICTED AREA MEANS …**
>
> "… an area of a work site where there is a reasonable chance that the airborne concentration of asbestos, silica, coal dust or lead exceeds or may exceed the occupational exposure limit for one or more of the substances;"
>
> OHS Code, Part 1, Section 1

The eight-hour occupational exposure limit for respirable crystalline silica is 0.025 mg/m^3.

Examples of controls that can reduce the release, accumulation or generation of silica include:

- Enclosed work areas, such as a blasting cabinet, room or booth for abrasive blasting.
- Wet work methods, such as using water, mist or foam at the source of dust generation, or watering pathways to reduce dust generated by traffic.
- Use of dust suppression products.
- Using high-efficiency particulate (HEPA) filters on air intakes, local ventilation hoods and dust collection systems to collect silica at the source.
  - Note powered mobile equipment doors and windows must be closed, and air conditioning on "recirculate", in order for air filters to be effective.

(Note that Sections 28 and 29 also apply to asbestos, coal dust and lead.)

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Health assessments for exposed workers

EXPOSED WORKER MEANS …

"… a worker who may reasonably be expected to work in a restricted area at least 30 work days in a 12-month period;"

OHS Code, Part 1, Section 1

Workers who meet the definition of exposed worker must be evaluated within 30 days of becoming an exposed worker and every two years afterwards with regular health assessments to identify any adverse health effects. Section 40 of the OHS Code requires a physician to interpret and explain key data (including the worker's chest X-rays, spirograms and exposure history) to the worker within specific time frames after a health assessment. The rules also direct that physicians must keep, and strictly control access to, the health assessment records for at least 30 years.

Workers may refuse (in writing) part or all of a health assessment, but employers must not coerce, threaten or force their workers to refuse.

Employers must schedule (where possible) health assessments during regular work hours, and cannot deduct a worker's wages, salary or other pay or benefits while the worker taking part in, or traveling to or from, their assessment. Employers must also pay the costs of the health assessment, interpretation and evaluation.

If an exposed worker had a health assessment from a previous employer within the immediately preceding two years, the worker must share the approximate date of that assessment with their current employer as soon as possible.

If you're a worker who may be exposed to silica, or the worker's employer or physician, consult Section 40 of the OHS Code directly to ensure that you understand and comply with the health assessment requirements. *(Note that Section 40 also applies to asbestos and coal dust.)*

Silicosis is a notifiable disease

Under Section 30 of the OHS Act, a physician or other health care professional must notify an OHS Director of Medical Services when they find a person with a notifiable occupational disease. Notifiable diseases in Alberta include silicosis.

CHECK THE RULES DIRECTLY

Always make sure you consult the *Occupational Health and Safety Act,* Regulation and Code directly to ensure you know all the rules that apply to you and your work site, including in relation to silica at the work site.

Note that you can use the Government of Alberta's OHS legislation search tool to quickly find and download individual sections of the act, regulation and code. You can also save and share a personalized PDF with information that's relevant to your workplace.

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Contact us

OHS Contact Centre

Alberta toll-free
- 1-866-415-8690

Edmonton region
- 780-415-8690

Deaf or hard of hearing (TTY)
- 1-800-232-7215 (Alberta toll-free)
- 780-427-9999 (Edmonton region)

Notify OHS of health and safety concerns

alberta.ca/file-complaint-online

> Call the OHS Contact Centre if you have concerns that involve immediate danger to a person on a work site.

Report a workplace incident to OHS

alberta.ca/ohs-complaints-incidents

Website

alberta.ca/ohs

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To provide feedback on this publication, visit ohs-pubstore.labour.ab.ca/ch059 and click "Give resource feedback". For more OHS resources, visit the OHS Resource Portal.

For more information

Harmful substances in the workplace (GS022)
ohs-pubstore.labour.alberta.ca/gs022

Legal terms 101: "Reasonably practicable" (LGT001)
ohs-pubstore.labour.alberta.ca/lgt001

Notifiable occupational diseases (MG030)
ohs-pubstore.labour.alberta.ca/mg030

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