Managing respirable crystalline silica risks

Silica is a naturally occurring and widely abundant crystalline mineral that forms the major component of most rocks, clays and soils. It is present in many products across a variety of industries and workplaces including natural stone products, ceramics, bricks, mortar, clays, aerated concrete, cement products, asphalt and grout.

How is respirable crystalline silica (RCS) hazardous?

Crystalline silica particles are so small they cannot be seen under normal light. They remain airborne long after other dust particles settle to the ground. Crystalline silica particles can be easily inhaled deep into the lungs and for this reason are referred to as respirable crystalline silica (RCS) dust:

- inhaling RCS can lead to silicosis – a serious and incurable lung disease that usually follows exposure to RCS over many years; extremely high short-term exposures can also cause it to develop
- RCS dust will remain airborne for long periods, even if you cannot see it
- crystalline silica is classified as a human carcinogen (group 1).

Management of RCS risk

Your workplace must ensure that nobody is exposed to RCS. It must eliminate activities that involve uncontrolled dry cutting or processing of materials that produce RCS dust.

Examples of activities conducted by department employees which may produce RCS may include, but are not limited to concrete cutting, drilling, chiseling or grinding, cutting pavers, working with cement/mortar powder, pottery making, cleaning kilns and associated housekeeping and clean-up activities such as dry sweeping.

This means **to protect from exposure it is important to use work practices that prevent any dust from becoming airborne**. If there is no dust, then the exposure risk is eliminated.

The first step to manage the risk is to identify which activities might generate RCS dust and determine if:

- **the materials contain crystalline silica** (refer to safety data sheet/label). If you can't find out how much crystalline silica is in the material, you should manage the risk on the assumption that it contains it; and
- **dust likely to contain RCS is generated**; or
- **dust is disturbed** that contains RCS, **causing it to become airborne**.

If there is a risk of exposure, the next step is to control it using the hierarchy of control:

- **eliminate** materials with crystalline silica or eliminate tasks that generates or disturbs RCS dust.

If elimination is not possible, minimise dust exposure so far as is reasonably practicable using a combination of controls. Take care to ensure that any new materials are safe to use and that any

new hazard they introduce is also controlled:

- Note: if the activity involves an **RCS process** with materials with ≥1% RCS, exposure must be controlled in accordance with WHS Regulation 2011 s529B. An RCS process is:
  - using power tools or mechanical plant for crushing, cutting, grinding, trimming, sanding, abrasive polishing, drilling or screening of crystalline silica containing material; or
  - any process that exposes, or is reasonably likely to expose, a person to RCS during handling e.g. cleaning and maintenance processes, such as sweeping or emptying a Class H or M vacuum cleaner.

Mandatory training (accredited training) is required where you assess the processing as high risk, as is a silica risk control plan. **Remember, if you don't generate dust, it will not be high risk.**

- **Substitute** - use a material containing less crystalline silica or change the task to one which generates less airborne dust e.g. score and snap fibre-cement sheeting rather than cut with a circular saw, buy pre-mixed wet clays and glazes to avoid the need to make pottery preparations from dry materials.
- **Isolate** e.g. enclose equipment or activities that generate RCS, prepare materials in a designated room/area away from teaching areas to control the spread of clay/cement dust. Isolation should only be used in combination with engineering controls, such as water suppression or dust extraction.
- **Engineering** controls use mechanical devices or physical controls to prevent RCS from being generated or released into the air e.g. use water suppression tools or local exhaust ventilation (LEV) e.g. wet (concrete) cutters, on-tool dust extraction, a fume hood, capture hoods/snorkels, booths.

If an exposure risk is still present with combinations of any of the above controls in place, you must use additional controls to further reduce the risk:

- **Administrative controls** are ways of working that are designed to further minimise worker exposure the hazard e.g. training, safe work procedures, dust reducing work practices, follow instructions and controls outlined in safety data sheets, on product labels and in risk assessments
- **Personal Protective Equipment** (PPE) if not using LEV where there is dust, then tight fitting respiratory protective equipment (RPE) is required e.g. wear a suitable P2/N95 mask. Note that:
  - RPE does not prevent or control dust from becoming airborne
  - fit testing and checking are mandatory when using this type of RPE. Note that not all workers may be able to wear RPE e.g. cannot achieve a close shave, may have breathing health conditions etc.
  - if a task requires RPE to be worn 30 times or more in 12 months when working with silica then health monitoring is required. Activities using chemicals or materials requiring health surveillance are not permitted to be undertaken by department employees.
  - wear plastic or vinyl-type aprons rather than porous cloth-type aprons which will retain dust.

Housekeeping

RCS can settle on surfaces, equipment and clothing. When disturbed it can be re-suspended in the air. After-task and regular clean ups are essential to minimise RCS residue in the workplace.

Suitable cleaning methods include damp/wet mopping or wiping, using a H or M class vacuum cleaner or using low-pressure water. Avoid cleaning methods that can disturb RCS and present an exposure risk such as dry sweeping, using compressed air or blowers and/or using high-pressure water blasters. Avoid leaving wet residues (slurries) or other waste materials that can dry out and act as a reservoir of RCS dust. Also, make sure there are facilities where staff and students can clean/wash up after the activity.

Contractors

Workplaces should consider engaging appropriate contractors to conduct servicing and maintenance where RCS dust risks are present e.g. servicing and cleaning of kiln interiors, masonry and concrete construction work.

If contractors are working with silica containing material on site, they must use the correct risk controls to prevent dust inhalation by workers and others in the workplace i.e. staff, students, visitors. Be sure to check with them before work starts to confirm that the risk of RCS exposure from contracted works is eliminated or minimised.

Soft fall and top dressing

The type of sand used for soft fall in the playgrounds must be certified under AS4422 for playground use (i.e. certified washed river sand, not fine sand or beach sand). If fine sands are used for top dressing of ovals, replenishing long jump pits etc. risk controls must be put in place to prevent inhalation of dust. The best risk control is elimination and not use fine particle sands at all.

Exposure standards

A national workplace exposure standard (WES) has been established for RCS of 0.05 mg/m^3 averaged over an eight-hour period. To illustrate, the WES will be exceeded if the dust breathed in over an 8 hour shift contains more RCS than the amount shown here next to a 5 cent piece (adapted from HSE). Note: exposure standards do not identify the dividing line between a healthy and unhealthy work environment. WHS Act 2011 s17 and s19 together require that exposure to substances in the workplace is kept as low as is reasonably practicable.

For example, the following **will** generate dust with more than 1% RCS and exceed the WES:

- tasks using powered tools on dry brick, concrete, nature stone, dried clay and fibre cement sheet
- dry sweeping of RCS dust, compressed air/high pressure water cleanup of RCS dust, dried RCS slurries and RCS dust build up in the work environment

The following are likely to generate exposure well below the WES:

- using non-powered tools to score and snap cement fibre sheets
- mixing of dry materials for less than 15 minutes per day (e.g. mixing small amounts of mortar or concrete)
- working with silica-containing products while they are wet

Even when the risk is low, you still need to manage risks so far as reasonably practicable, including following any recommendations from the manufacturer.

Consider the need to manage the risk of exposure when mowing areas that might generate RCS dust and cause it to become airborne (note that Q fever risk must also be managed).

Where activities are identified that will require health monitoring, they are not permitted. For example, if a person has worked with RCS materials that make or disturb RCS dust and have worn RPE for those tasks on 30 days or more over a 12-month period, health monitoring would be required, so the activity is not permitted.

Consulting with staff

- share information about sources of RCS exposure at the workplace
- share information about health risks from RCS
- give workers a reasonable opportunity to raise, talk and consider views about health and safety issues
- advise workers of the outcome of the consultation in a timely way.

Choosing the right controls

Remember, the best way to prevent anyone being at risk of exposure is to choose the right controls to prevent or minimise the release of RCS into the air. Use a combination of controls to minimise risk.

Resources

- Silica resources – WorkSafe Qld.
- When conducting RCS processes, you must apply controls to the activity as described in the Managing respirable crystalline silica dust exposure in construction and manufacturing of construction elements Code of Practice. The Code provides information on RCS hazards and effective dust controls. Appendix 4 in this Code outlines specified controls for power tools, mobile plant, housekeeping and clean-up activities. It also describes controls for low-risk tasks that workplaces will find as helpful as base level exposure controls.
- Creating Healthier Workplaces > Hazards and Risks > Dust