

RESPIRABLE CRYSTALLINE SILICA IN THE WORKPLACE

Emerging cases of silicosis induced by respirable crystalline silica in the workplace are on the rise in Australia. Evidence suggests that there are currently at least 477 Australians living with silicosis. Most of these cases have been diagnosed within the past three years and are linked to inhaling dust while cutting and polishing engineered stone.¹

What is it?

Crystalline silica is a mineral compound found in soil, rock and sand. Respirable crystalline silica (RCS) is generated by the vigorous processing of compounds that contain crystalline silica in the form of dust. Examples of processing activities are, cutting, sawing, drilling, grinding and polishing materials that contain crystalline silica. RCS particles are very small, as such they are likely to remain airborne longer than larger dust particles and are invisible to the naked eye.

Compounds and the amount of RCS contained are outlined below²

Type	Amount
Marble	2%
Limestone	2%
Granite	20 to 40% (typically 30%)
Shale	22%
Natural sandstone	70 to 95%
Engineered Stone*	up to 97%

*Engineered stone does not include concrete, concrete products, cement products, fibre cement, bricks, blocks, pavers, autoclaved aerated concrete, roof tiles, wall and floor tiles that are ceramic or porcelain, grout, mortar, render and plasterboard.



What does it do?

When generated, RCS may be inhaled, lodging deep within the lungs. A number of diseases have been associated with the inhalation of RCS with silicosis being the primary disease.

Silicosis is divided into three main types:

Acute silicosis can develop after short-term and very high levels of silica dust (for example less than one year, and after a few weeks). Acute silicosis causes severe inflammation and an excess protein in the lung.

Accelerated silicosis can occur from short term exposure to large amounts of silica dust (1 to 10 years of exposure). Accelerated silicosis causes inflammation, and protein and scarring of the lung (fibrotic nodules).

Chronic silicosis can result from long term exposure (over 10 years of exposure) to low levels of silica dust. Chronic silicosis causes scarring of the lung and shortness of breath.

Additional diseases associated with RCS include:

- Chronic bronchitis
- Emphysema
- Kidney damage
- Lung cancer
- Scleroderma³

Who in particular is at risk?

Workplaces that manufacture, install or modify engineered stone have experienced a spate of instances of silicosis over the past few years, however it is expected that the number of cases recorded do not accurately reflect the number of instances occurring as it is not presently a reportable illness.

Additional workplaces and activities that may provide an exposure to RCS include:

Workplaces

- building, construction and demolition work
- preparing kitchen/laundry benchtops (manufactured stone)
- excavation work
- abrasive blasting
- mining, quarrying, crushing and tunneling work
- brick manufacturing
- road building
- stonework
- foundry work
- explosives and blasting work.

Activities

- brick cutting
- grinding of masonry
- concrete cutting, chiseling and jack hammering
- cleaning up of dust and debris created by the above activities
- cutting and working with manufactured stone.⁴

Who has health and safety duties in relation to working with engineered stone?

Duty holders with a role in managing the risks of RCS when working with engineered stone include:

- persons conducting businesses or undertakings (PCBUs)
- officers
- designers, manufacturers, importers, suppliers
- workers, and
- other persons in the workplace.

A person can have more than one duty and more than one person can have the same duty at the same time.

For additional information, refer to the relevant state specific work health and safety legislative requirements.

How can exposure be controlled?

As silica becomes respirable in dust form, it is important that exposure to dust is minimised to acceptable, safe levels. The workplace exposure standard for RCS under the model WHS laws is 0.05 mg/m³ as an eight hour time weighted average (TWA).⁵ A good way to eliminate risks arising from exposure to silica dust, or if that is not reasonably practicable, minimize the risks is to apply the Model Code of Practice hierarchy of control measures created for managing the risks of RCS. Some examples include:

Control measure	Example
Eliminate	Do not use engineered stone, or eliminate the need to cut, grind, trim, drill, sand or polish engineered stone during installation.
Substitute	Substitute engineered stone with a product that contains a lower percentage of crystalline silica such as wood or laminate.
Isolate	Separate workers from silica dust by providing physical barriers and exclusion zones to prevent dust or water mist moving into other work areas.
Engineering controls	Use physical methods to change the characteristics of a task, such as on-tool LEV extraction or water suppression, in order to eliminate or minimize RCS. When considering and using engineering controls, be aware of other hazards that may be introduced.

Further information can be sourced directly from the Model Code of Practice⁶

Important notes:

Health monitoring of employees engaged in activities that are exposed to RCS are included in relevant WHS/OHS legislation.

Abrasive blasting of material containing >1% crystalline silica has been banned in Victoria and dry cutting of engineered stone has been banned in Queensland.

Additional information:

Health Monitoring for Exposure to Hazardous Chemicals - Guide for persons conducting a business or undertaking

Health Monitoring for Exposure to Hazardous Chemicals - Guide for workers

Health Monitoring for Exposure to Hazardous Chemicals - Guide for medical practitioners

References

1. National Dust Disease Taskforce 2021. Final Report to Minister for Health & Aged Care, June 2021. Pg 13/14
2. Safe Work Australia, 2021, Model Code of Practice: Managing the risks of respirable crystalline silica from engineered stone workplace www.safeworkaustralia.gov.au/silica
3. *ibid.*
4. *ibid.*
5. Safe Work Australia, 2020, Workplace exposure standards for airborne contaminants, www.safeworkaustralia.gov.au/doc/workplace-exposure-standards-airborne-contaminants (Accessed 2 October 2020)
6. Safe Work Australia, 2021, Model Code of Practice: Managing the risks of respirable crystalline silica from engineered stone workplace www.safeworkaustralia.gov.au/silica

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