

CRYSTALLINE SILICA

Technical information

Why is crystalline silica a priority chemical?

The NSW Work Health and Safety Roadmap has a target of a 30 per cent reduction in serious injuries and illnesses by 2022, which comprises a reduction in exposures to hazardous chemicals and materials. An initial list of 100 priority chemicals was developed based on national and international sources. This list was further refined using the following criteria: toxicity rating, exposure potential, estimated quantities used or generated and potential number of workers using these chemicals. Crystalline silica ranked the second highest based on these criteria. Crystalline silica is a very common mineral used in manufacturing building products and in construction materials. Applying adequate controls such as minimising the generation of airborne dust can reduce hazardous exposures and prevent illness in the workplace.

Sources of exposure

Materials and products containing crystalline silica include shale, sandstone, concrete, bricks and manufactured stone. Workers can come across crystalline silica during excavation or tunnelling through quartz containing rock such as shale or sandstone. A health hazard is created when the very fine particles of crystalline silica can be inhaled. The size fraction of airborne dust that can reach the lungs where air exchange takes place is known as the 'respirable fraction'. Once particles become larger than about 7 microns (1 micron = 1/1000 mm) in diameter, they are no longer respirable. Significant levels of airborne dust are most likely to occur when materials or products in the workplace are cut, sanded, drilled or during any other activities which create fine dust. Exposures in workplaces can also occur through dry sweeping or using compressed air (rather than wet cleaning or using a vacuum with HEPA filter) and re-suspension of settled dust from clothing or fabric materials.



Cutting fibre cement sheet with dust extraction



Tunnelling with ventilation

Health effects

Respirable crystalline silica (RCS), depending on factors such as how much dust a worker breathes in and for how long, can cause silicosis. Silicosis is a fibrosis (scarring) of the lung resulting in loss of lung function. This fibrosis is incurable and continues to develop after exposure has stopped. Persons with advanced silicosis suffer severe shortness of breath and may suffer complications such as heart failure.

Silicosis can be further classed into:

- *Chronic (or classic) silicosis*, typically observed in workers after 15 years or more since they were first exposed;
- *Accelerated silicosis*, appearing in workers after high exposure over a shorter period of time (5 to 10 years); and
- *Acute silicosis*, observed in workers within a few months to two years after exposure to silica at very high concentrations. Acute silicosis can cause very serious health effects and is life threatening. Significant long term exposure to crystalline silica has also been associated with an increased risk of developing lung cancer.

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Labelling and Safety Data Sheets

Manufacturers and importers of products containing crystalline silica (a hazardous chemical) need to determine if workers can be exposed to the respirable fraction of airborne dust when working with these products eg when cutting. Where exposure to RCS can occur, products must be labelled and safety data sheets provided (cl 329, 330 and 335 of the WHS Regulation 2017). Suppliers of a hazardous chemical to a workplace must provide current safety data sheets (cl 339). The PCBU* must also obtain a copy of the safety data sheet and make it readily accessible to workers involved in using, handling or storing the hazardous chemical at the workplace (cl 344).

*Persons Conducting a Business or Undertaking

Exposure standards and air monitoring

Respirable crystalline silica has a workplace exposure standard of $0.05\text{mg}/\text{m}^3$ averaged over 8 hours. Risks to health and safety from exposures to hazardous chemicals must, so far as is reasonably practicable, be eliminated (cl 35). PCBUs must ensure that no person at the workplace is exposed to a substance above its exposure standard (cl 49) and must reduce exposures so far as is reasonably practicable. PCBUs must undertake personal exposure (air) monitoring for substances with an exposure standard if they are not certain (on reasonable grounds) as to whether or not the exposure standard is exceeded (cl 50). Adjustments to the exposure standards are made for extended work shifts, taking into account the longer daily exposure. Air monitoring results must be readily available to workers and records of results kept for 30 years (cl 50). A PCBU must review any control measures implemented, if a workplace exposure standard for a substance has been exceeded (cl 352).



Health monitoring

PCBUs are required to provide health monitoring to workers if there is a significant risk to the worker's health because of exposure to crystalline silica (cl 368). Crystalline silica is listed in Schedule 14 of the WHS Regulation 2017 which outlines the health monitoring requirements.

In relation to health monitoring, PCBU (cl 369 to 378) duties include:

- Informing workers of the requirements for health monitoring.
- Using a registered medical practitioner with experience in health monitoring.
- Providing details to the medical practitioner.
- Obtaining a copy of the health monitoring report.
- Providing a copy of the health monitoring report to SafeWork NSW if the worker has developed a disease or injury and/or the report contains any recommendations on remedial measures at the workplace.
- Keeping records of health monitoring for 30 years.

Workers exposed to respirable crystalline silica at levels or a frequency not resulting in a significant risk to health, are not required to undergo health monitoring. Workers relying on personal protective equipment such as respirators for controlling their exposures below the exposure standard must be included in health monitoring.

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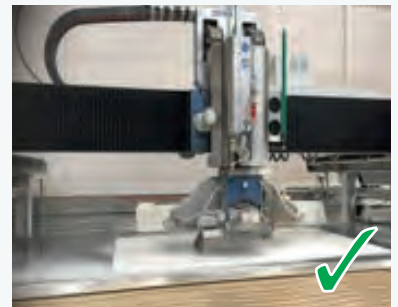
Control measures

Where risks to health and safety cannot be eliminated the hierarchy of controls must be applied in accordance with cl 36 of the WHS Regulation 2017 to minimise risks. For instance:

- Apply water suppression systems to reduce dust generation.
- Use local exhaust ventilation systems to remove dust at the source.
- Ensure such ventilation is correctly placed and operates at effective flow rates.
- Use dust removal systems on tools to reduce dust exposure of mobile workers.
- Isolate areas of the workplace where dust is generated by other workers.
- Assess the level of personal exposure among workers performing high risk tasks.
- Ensure regular housekeeping in dusty work areas to prevent the accumulation of dust.
- Provide suitable personal protective equipment (PPE), including a program to correctly fit, instruct on the use and ensure regular maintenance of respiratory protective equipment (RPE).

PCBUs must provide suitable information, training, instruction and supervision to workers using, storing and handling hazardous chemicals; regarding the nature of the work, risks and the controls implemented (cl. 39 and 379).

PCBUs with duties under the WHS Regulation 2017 must review and revise control measures, as necessary, to maintain a work environment so far as is reasonably practicable, that is without risk to health or safety (cl 38).



Water suppression for cutting bench tops



Water suppression for cutting

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Where to find more information

Safety Data Sheets

NSW Codes of Practice:

- a. Managing the Risks of Hazardous Chemicals in the Workplace
- b. Preparation of Safety Data Sheets for Hazardous Chemicals
- c. Labeling of Workplace Hazardous Chemicals
- d. Construction Work

Safe Work Australia Guidance Material

- a. Workplace Exposure Standards for Airborne Contaminants
- b. Guidance on the Interpretation of Workplace Exposure standards for Airborne Contaminants
- c. Health Monitoring for Exposure to Hazardous Chemicals – Guide for persons conducting a business or undertaking
- d. Health Monitoring for Exposure to Hazardous Chemicals – Guide for workers
- e. Guide for Tunnelling Work

Australian Standards

- a. AS/NZS 1715-2009 Selection, use and maintenance of respiratory protection
- b. AS 2985-2009 Workplace atmospheres method for sampling and gravimetric determination of respirable dust

Disclaimer

This publication may contain information about the regulation and enforcement of work health and safety in NSW. It may include some of your obligations under some of the legislation that SafeWork NSW administers. To ensure you comply with your legal obligations you must refer to the appropriate legislation.

Information on the latest laws can be checked by visiting the NSW legislation website www.legislation.nsw.gov.au

This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

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