WORKSAFE ACT SAFE + HEALTHY WORKPLACES

GUIDANCE NOTE

CRYSTALLINE SILICA DUST

OVERVIEW

This guidance note has been developed to raise awareness about the occupational hazards and risks related to silica dust and the duties of persons conducting a business or undertaking (PCBU).

Estimates show that over 230 lung cancer cases in Australia each year are caused by exposure to silica dust at the workplace. A significant increase in the number of workers found to have accelerated and chronic silicosis has been recorded in Australia, also due to exposure to silica dust at work. Around 600,000 Australian workers each year are exposed to silica dust at work, including miners, commercial and residential construction workers, farmers, engineers, bricklayers and road construction workers, as well as those working in demolition.

Exposure to silica dust can be minimised and the risk of damage to a worker's lungs can be significantly reduced through preventing dust generation, wet processing, targeted ventilation, good housekeeping and suitable respiratory protection.

Working safely with silica and silica containing products rests with both PCBUs and workers. PCBUs (for example, employers) have a legal responsibility under the *Work Health and Safety Act 2011* (section 19) to provide a safe place to work, safe ways to work and monitoring the conditions at the workplace. PCBUs have additional responsibilities under the *Work Health and Safety Regulation 2011* to provide health monitoring for workers, conduct air monitoring and for those working in construction with engineered stone products, prepare a Safe Work Method Statement (SWMS). Those working with silica will be provided training, instruction and supervision by their PCBU and should be aware of the risks, follow safe work instructions provided to them and ensure that they are not exposed to silica dust.

WHAT IS SILICA DUST?

Silica is a common naturally occurring mineral, also known as silicon dioxide. Silica can be found or manufactured in different forms, broadly divided into crystalline and non-crystalline (amorphous).

The most common form of silica is quartz. Silica is found in some stones, rocks, sand, gravel and clay. Silica can also be found in:

- bricks
- pavers
- tiles, and
- concrete.

When natural stone or rock and other silica containing products are cut, crushed, drilled or sanded, dust is released. The very fine portion of the dust that is generated is known as respirable crystalline silica or silica dust.

HOW DOES SILICA GET INTO YOUR LUNGS?

Silica dust is a hazard when it is airborne and a risk when it is within your breathing zone (a 30 cm area around your head). Silica dust can become airborne as it is generated for example, when a worker fabricates engineered stone products, chases or drills into concrete, rips up old concrete or bitumen roads, jackhammers or saws old concrete or excavates sites with sandstone, clay or granite. Sometimes, silica dust becomes airborne through housekeeping tasks like sweeping or when a worker removes work clothes and personal protective equipment.

Silica dust is 100 times smaller than a grain of sand, so, workers can breathe it in without knowing. The tiny dust particles can remain in the air for long periods after the larger dust particles, that we can see with the naked eye, settle.

WHAT DISEASES DOES EXPOSURE TO SILICA DUST CAUSE?

Breathing in silica dust can cause:

- chronic bronchitis – inflammation of the airways resulting in cough and irritation
- emphysema – destruction of the lung tissue and loss of surface area for the exchange of gases such as oxygen and carbon dioxide
- acute silicosis – extremely high dust exposures after just a few months or years can result in severe inflammation and an outpouring of protein in the lung
- accelerated and chronic silicosis – scarring of the lung tissue causing shortness of breath and interfering with the exchange of gases which take place in their air sacs
- lung cancer – occurs with heavy exposure to silica but smokers have a higher risk
- kidney damage – may require dialysis if severe
- scleroderma – a disease of the connective tissue of the body resulting in the formation of scar tissue in the skin, joints and other organs of the body – pins and needles in the hands can be a symptom.

Some of these diseases have a long latency period and do not appear until years and sometimes decades after exposure stops. Others, especially after high levels of exposure to silica dust, can result in symptoms very soon after just one exposure.

WHO IS AT RISK OF EXPOSURE TO SILICA DUST?

The workers most at risk of exposure to silica dust are those who use power tools or mechanical equipment on silica containing stone or rocks and products that contain high levels of silica. This can include any worker who:

- uses a power tool to cut or modify engineered stone, for example fabricating and installing kitchen benchtops

- blasts, excavates or tunnels into sandstone, clay or granite
- drills, cuts or chases into concrete and brickwork
- cuts bricks, pavers or tiles
- dry angle grinds on concrete or masonry
- jackhammers, scabbles or chisels concrete
- cleans up the dust and debris created by the above activities, including dried concrete slurry
- dismantles equipment or disposes of offcuts covered in dust, or
- demolishes buildings.

HOW DO I IDENTIFY AND MANAGE SILICA DUST AT MY WORKPLACE?

It is important to know what materials you are working with or on; these can be natural or man-made.

Where it is available, read the Safety Data Sheet (SDS) for the products that you work with and see if the components listed include quartz, cristobalite or crystalline silica. Some silica containing products do not require a SDS, but you may find information in the product information sheet or manufacturer's website.

If the silica dust is generated from a natural source such as in tunnelling, excavating or drilling operations, you will need to seek alternative information about the likelihood of silica being present in the dust.

Managing the risk of exposure to silica dust includes considering:

- what activities will workers carry out?
- will these activities generate dust?
- who could be exposed and where?
- do you need to implement any control measures to minimise exposures?
- how do your worker's clean up?

Managing the risk of exposure to silica dust needs a combination of high level control measures (isolation, substitution and engineering controls) with administrative measures and, for most activities, personal protective equipment (PPE). While wet methods significantly minimise the risk of exposure when compared to dry ones, it does not eliminate the risk of exposure to silica dust. A combination of local exhaust ventilation or dust collection and wet methods has been shown to significantly reduce airborne dust generation. RPE should still be considered, and all collected dust and slurry removed, especially before it dries and poses a dust risk.

As the PCBU, you can control the risk by:

- using alternatives to sand when abrasive blasting such as metallic shot, slag products or grit
- using products or materials containing less silica
- keeping dust generating activities physically separated from other work areas
- changing the way dust generating tasks are carried out, for example using wet methods

- using dust collection methods and equipment when using drills, routers and saws
- fitting large machinery (excavators and bulldozers) with cabs that have an air filtering system
- minimising the generation of airborne dust through planning cut sequences, and
- cleaning up dust using an industrial vacuum cleaner with a HEPA filter or wet sweeping.

WHAT RPE SHOULD I CHOOSE FOR MY WORKERS?

Workers should wear RPE that protects for dusts (or particulates) and has an appropriate safety factor for any residual risks posed after implementing higher order control measures. Where the silica concentration is lower product or material, a properly fitted P1 respirator or mask may be suitable. Where engineered stone or other high silica content products are being worked on, a P2 or half-face respirator should be considered. For tasks using wet methods, sometimes a full-face P2 respirator is more comfortable to wear. There are also positive air pressure respirators (PAPR) available that pump clean air into the breathing zone of the worker while they are working.

It is critical that RPE is fit tested for the individual worker wearing it to ensure that there is an effective seal. In most cases, this will mean your workers must be clean shaven. There are some full face and hood PAPRs that can be considered for those workers with facial hair.

WHAT IS INVOLVED IN HEALTH MONITORING?

PCBUs must provide health monitoring to workers where there is a significant risk to the worker's health because of exposure to silica dust. PCBUs must inform workers of the requirements for health monitoring and ensure appropriate training and equipment is provided and used.

Where engineered stone products are fabricated, installed or modified health monitoring must be provided to workers. This is because dust from these products contains very high concentrations of silica and respiratory protective equipment is generally required to be used by workers in combination with higher level controls. Because of the high silica content and a reliance on RPE, it is considered that any dust exposure when working with these products poses a significant risk to health.

For other silica products, health monitoring should be considered where RPE is required to be worn for 30 or more shifts per year.

Health monitoring is supervised or carried out by a registered medical practitioner (doctor) who has experience in health monitoring. Generally, the testing will include a questionnaire, lung function tests and a chest X-ray or high resolution computed tomography (HRCT). The doctor will decide what tests are needed based on the type of work being undertaken, the products being worked on and the worker's exposure history.

Health monitoring records are confidential and required to be kept for at least 30 years. A copy of the report must be provided to the worker as soon as the PCBU can after it is

obtained from the doctor. Health monitoring reports that include any advice that the worker has contracted a disease, injury or illness must provide a copy of the report to WorkSafe ACT as soon as practicable.

WHAT IS INVOLVED IN AIR MONITORING?

Air monitoring involves measuring the amount of dust in a worker's breathing zone. Generally, silica dust will be collected for at least 75 % of their shift. Air monitoring should be carried out by a competent person, such as an occupational hygienist. It must be carried out if the PCBU is unsure if the workplace exposure standard has been exceeded or if it is necessary to determine if there is a risk to worker's health. Air monitoring reports must be kept for 30 years.

On 1 July 2020, a new workplace exposure standard for silica dust came into effect in the ACT to better protect workers employed in the building, construction and stonemasonry sectors. The revised workplace exposure standard is an eight hour time weighted average (TWA) of 0.05 milligrams per cubic metre (mg/m^3). Under regulation 49 of the WHS Regulations, this exposure standard must be measured within the worker's breathing zone and must not be exceeded.

HOW CAN MY WORKERS PROTECT THEMSELVES?

You must provide your workers with training and ensure that they understand the risks of working around silica dust, the control measures in place, how to use their PPE and what is required of them for health monitoring. This may involve providing training in other languages.

Encourage your workers to talk to you or their chosen representative about any concerns they have with their work and to promptly report any problems with their equipment or RPE.

FURTHER INFORMATION

Further information on silica dust can be found on the WorkSafe ACT website.

The following information is available from the Safe Work Australia website:

Workplace exposure standards for airborne contaminants
Guidance on the interpretation of workplace exposure standards for airborne contaminants
Health monitoring when you work with hazardous chemicals – guide for workers
Hazardous chemicals requiring health monitoring