Australian Tile Council Inc.

Leading the Industry

# SILICA DUST AND CERAMIC TILES

## WHAT IS SILICA?

Silicon (Si) is naturally occurring and the second most common element in the Earths crust.
The compound silica, also known as silicon dioxide (SiO2), is formed from silicon and oxygen atoms.

Since oxygen and silicon makeup about 75% of the Earths crust, the compound silica is very common. It is found in many rocks, such as granite, sandstone and slate as well as in sand and soil.

The most common type of crystalline silica is quartz.

## WHERE IS SILICA USED?

Silica is very commonly used in construction and at various concentrations in bricks, blocks, tiles, slabs, cement and concrete.

**Silica dust is found in many products** in our day- to-day lives such as **glass, composite stone, ceramics, semi-conductors and much more.**

Examples of work activities that can generate respirable silica dust particles include:

- During fabrication and installation of composite (engineered or manufactured) stone countertops.
- Excavation, earth moving and drilling plant operations.
- Clay and stone processing, machine operations.
- Paving and surfacing.
- Mining, quarrying and mineral ore treating processes.
- Tunneling.
- Construction laboring activities.
- Brick, concrete or stone cutting; especially using dry methods.
- Abrasive blasting.
- Foundry casting.
- Angle grinding, jack hammering and chiseling of concrete or masonry.
- Hydraulic fracturing of gas and oil wells, and,
- Pottery making .

## WHAT IS SILICA DUST?

Silica dust is generated in workplace mechanical processes such as crushing, cutting, drilling, grinding, sawing or polishing of natural stone or man-made products that contain silica.

Some dust particles can be so small that they are not visible; these are commonly referred to as respirable particles.

Respirable silica dust particles are small enough to penetrate deep into the lungs and can cause irreversible lung damage.

The non-crystalline or amorphous forms of silica do not cause this kind of lung damage.

**WHAT IS SILICOSIS?**

Silicosis is a form of occupational lung disease caused by inhalation of crystalline silica dust, and is marked by inflammation and scarring in the form of nodular lesions in the upper lobes of the lungs. Silicosis (particularly the acute form) is characterised by shortness of breath, cough, fever, and cyanosis (bluish skin)

**CERAMIC TILES AND SILICA DUST**

Unlike many other engineered products, ceramic tiles are made from a combination of clays, feldspars and other natural occurring minerals, mixed and grinded in water and fired in a high temperature kiln.

As a final inert product they only contain a fraction of sintered crystalline silica.

**Tile products** are **odorless**, **stable, non-flammable**, **does not release any hazardous chemical** and are considered as **non- hazardous to health under normal conditions of use.**

**HANDLING AND STORAGE**

**Tiles** are **inert** and **pose no immediate hazard to health in storage, handling or insitu** (final use)

**CUTTING, GRINDING, CRUSHING, DEMOLITION REMOVAL WORK**

**Dust** containing crystalline silica is **produced by dry mechanical cutting** and **grinding** of tiles during installation or by operations such as demolition / removal projects. In the event of cutting grinding, crushing or removing tiles avoid breathing dust by using equipment with integral dust collection and or appropriate exhaust ventilation. Use approved respirators whenever engineering controls are not effective to keep the dust, and particularly the crystalline silica dust, below the workplace exposure standards for airborne contaminants limits. **Wet cutting methods are recommended.**

**Other areas** of installation that may lead to airborne dust that needs consideration are **substrate preparation** and **fixing material mixing.**

**EFFECTIVE CONTROLS**

All Australian workplaces must follow work health and safety laws, which vary from state to state. However the duty of care for employers and responsibilities of workers across Australia is similar.

- Employers are required to ensure the health and safety of their workers at their workplace
- Within reason, workers must take care of their own health and safety, not negatively affect that of others and follow instruction and workplace health and safety policies.

**Exposure to hazards** can generally be **reduced by following the risk management process** below –

**Eliminate** – How can we totally get rid of the risk?

**Substitute** – Can we change how we cut tiles? E.g. ‘score and snap rather then power tools.

**Engineer Controls** – Use methods to lower exposure e.g water saws, ventilation, etc

**Administrative Controls** – Training, signage, prompts, etc

**Personal Protective Equipment**- Masks, breathing apparatus.

Workers should always be involved in the process to correctly identify hazards and control measures that suit the workplace and task. If suitable control measures are not in place, anyone working around silica dust has an increased risk of developing silicosis.

Workers must be given information and training on:

- Possible health effects of silica dust exposure,
- Health surveillance, and,
- Control measures and how to use them (as summarized in the below table).

| ACTIVITY | CONTROL |
|---|---|
| **Construction, planning and design** | For example, by:<br>• Planning the project to minimize cutting<br>• Planning commercial sites to include a correctly equipped cutting shed<br>• getting materials cut to size off-site if practical<br>• Obtain a MSDS from your tile supplier, outlining the correct usage and handling processes |
| **Select the correct equipment** | • Use “score and snap” cutters where possible rather than saws or grinders.<br>• Ensure saws have dust suppression features.<br>• Selecting the correct PPE |
| **Use water suppression when possible** | • Water suppression should be used whenever possible; especially when LEV is not suitable.<br>• Water should be used through non-electric tools to wet dust down at the point of dust generation. For example, water should be provided to the blade when using saws; just wetting the material is not enough.<br>• Ensure equipment and work areas are cleaned regularly with water.<br>• Use water spray or rubber curtains around conveyor transfer points. |
| **Ensure tools have on-tool extraction** | • Use LEV that fits directly onto hand-held machines. This is the most effective way of controlling dust. |
| **Use workshop ventilation** | • Have enclosures or hoods and local exhaust ventilation (LEV) to remove the dust at the point it’s produced. |
| **Wear the correct PPE** | • If possible, wear disposable clothing at work. Before you leave work, shower and change into clean clothes. Do not take your dusty clothes home to wash. |
| **Know how to use your respiratory protective equipment (RPE) correctly** | • No RPE can prevent all silica dust from being breathed in. So, RPE should be used in combination with other controls.<br>• RPE cannot protect you if it doesn’t fit properly. Employers should have workers fit tested and trained in their use and maintenance. This is even more important if you have facial hair.<br>• It is important to choose the right RPE for the job; use the AS/NZS 1715:2009 standards for guidance on the selection and use of RPE. |
| **Reduce exposure using administrative controls** | • Display warning signs if tasks create silica dust.<br>• Rotate staff to limit the time they are exposed.<br>• Locate silica dust work outdoors, away from other workers who are not required for that task. |
| **Clean-up correctly** | • DO NOT ‘clean up’ with compressed air or by dry sweeping. Dust should be removed using an industrial HEPA (high-efficiency particulate air) filter vacuum, which should be cleaned and maintained regularly. |