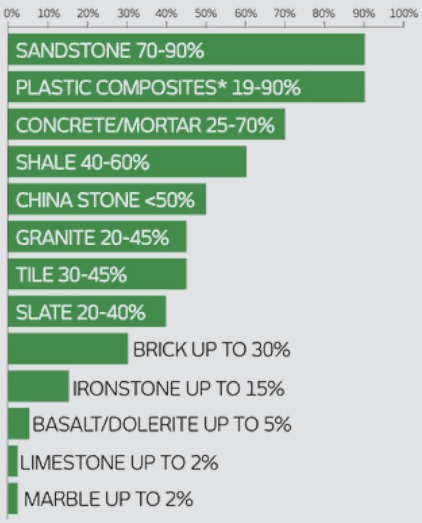
Silica Dust:

The Facts, The Risks & How To Protect Yourself

Silica Dust: The Facts

- Silica dust is the 2nd leading cause of occupational cancer deaths, after asbestos
- 230 Australians will be diagnosed with lung cancer each year due to past silica dust exposure
- Harmful silica dust particles are created when working with stone, rock, concrete, brick, mortar, plaster and industrial sand
- Silica dust particles are up to 100 times smaller than one grain of sand
- Overexposure can lead to silicosis, tuberculosis, kidney disease, chronic obstructive pulmonary disease and arthritis.

The Numbers: Materials Containing Silica



Silica Dust kills approximately 100 workers in Australia each year

In Australia, 600,000 workers, particularly in construction, tunnelling, mining, and stone fabrication, are exposed to silica dust, despite recent stricter regulations. After asbestos, silica is one of the leading causes of occupational cancer deaths in the country.

What is Silica Dust?

Crystalline silica is a material found naturally in the earth's crust. It is found in sand, stone, rocks, concrete, bricks and mortar. The dust from crystalline silica is generated during work operations that significantly disturb any of these materials, such as cutting, sawing, sanding and drilling.

Silica dust particles are more than 100 times smaller than one particle of beach sand, meaning you won't be aware of inhaling them. And due to their microscopic size, the body's natural defences can't stop them from penetrating deep into the lungs, resulting in potentially fatal consequences.

"I don't mean to be graphic about it, but the way in which people lose their lives through these dust diseases is horrific," – NSW Premier, Chris Minns on dust diseases.

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Protecting people and our environment

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Sources of Silica Dust in Construction

- Demolition
- Cutting or grinding
- Sanding
- Drilling
- Abrasive blasting
- Stonemasonry
- Buffing
- Polishing and tunnelling

A Workplace Exposure Standard (WES) is the maximum concentration of an airborne substance, averaged over a specified reference period – usually 8 hours – to which workers can be exposed by inhalation under Australian work health and safety laws.

Given respirable crystalline silica (RCS) is classified as a Group 1 carcinogen, Safe Work Australia has set a Workplace Exposure Standard of 0.05 mg/m³ over an 8-hour time-weighted average.

The WES for silica was halved from an eight-hour time weighted average of 0.1 mg/m3 from 1 July 2020.

For further information, please please contact your state or territory work health and safety regulator.

What are the health implications of exposure to Silica Dust?

With continuous exposure to silica dust, its build-up over time can lead to fatal cancers, diseases and severe chronic illnesses, including:

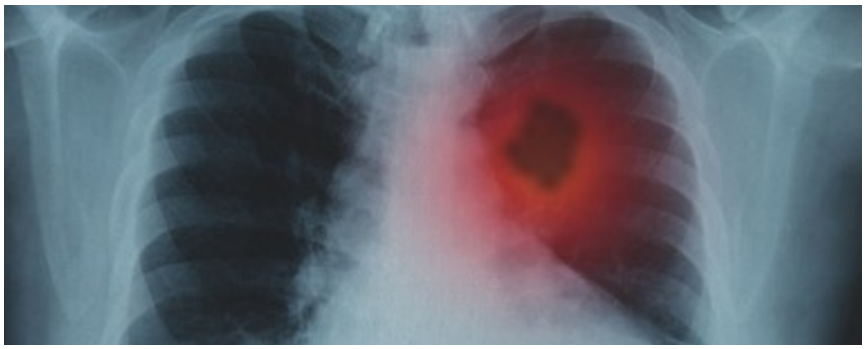
Silicosis: A form of occupational lung disease caused by inhaling large amounts of crystalline silica dust over a long period of time. This continuous build-up leads to areas of hardened and scarred lung tissue, which results in the lungs being unable to function effectively.

Chronic obstructive pulmonary disease (COPD): The collective term of a group of lung diseases where the lungs become inflamed, damaged and narrowed. The result is an inability to breathe easily, making day-to-day activities a challenge.

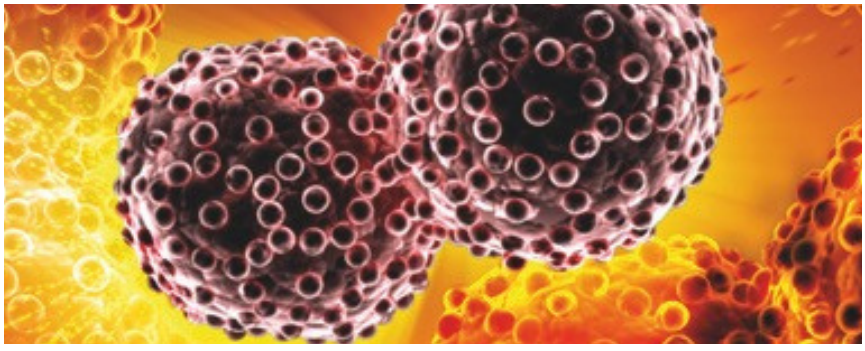
Tuberculosis: A disease of the lungs with symptoms including a persistent cough, fatigue, loss of appetite and fever. If left untreated, tuberculosis can kill.

Kidney disease and rheumatoid arthritis: Continuously inhaling silica dust can cause renal diseases, and studies also link skin exposure to silica dust particles with the development of autoimmune disorders such as Systemic Lupus Erythematous, rheumatoid arthritis and scleroderma.

Lung cancer: Exposure to silica dust can cause lung cancer. The International Agency for Research on Cancer (IARC) notes: "Crystalline silica in the form of quartz or cristobalite dust is carcinogenic to humans (Group 1)."



X-ray image of patient lungs and lung tumour.



Lung cancer cells.

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Employers' Responsibilities

Employers have a legal duty to take all practicable steps to ensure that the health of their workers is protected by removing, isolating or reducing silica dust in the workplace.

Employers must also ensure workers are doing the job correctly and that they're trained in the following areas:

- Dust risks and how this can harm their health
- Dust controls and how to check that they are working
- How to maintain and clean equipment
- What RPE should be used and how to look after each piece
- What to do if something goes wrong

RVT offers a free site assessment and best practice guidance

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Controlling the harmful effects of Silica Dust

To protect workers from the harmful effects of silica dust, there are three key control methods to apply:

1. Assess the risks

When assessing the risk of exposure to silica dust, it's important to consider these four points:
Type of task: If machinery such as sanders, grinders and grit blasters are to be used, more dust will be generated.
Work environment: In small spaces, dust will build up much quicker than when working outside. Whilst both environments are deadly, control methods may vary.
Time involved: If the task is complex or large, the length of time that dust will be generated increases, as does worker-exposure.
Frequency: For repetitive tasks, dust is continually being produced and for those workers carrying out the same activity regularly, the risk grows.

2. Implement control measures

As per the hierarchy of control, you should first look to see if there is a way to eliminate, substitute or isolate the risk by considering:

- Alternative materials
- Different methods of work

If the risk cannot be eliminated, substituted or isolated you will need to implement appropriate engineering controls:
1. Extraction and filtration units: Select an extraction system that has a suitable capture hood, sufficient airflow for the level of dust being generated, and a HEPA filter that will remove 99.97% of particulate. You can also reduce the risk of dust migration, by using appropriate containment tents or enclosures and creating a negative pressure environment.
2. Water: Using water to dampen down the work area before, during and after the dust-generating task can be an effective way to reduce harmful dust particles from permeating the air. But for this method to work, sufficient water at the right levels must be used for the duration of the task.
3. Respiratory protective equipment (RPE): In addition to the extraction and water control methods detailed above, RPE should also be provided and used correctly. When working in an environment where dust is present, the assigned protection factor (APF) is a minimum of 20.

3. Review the controls

Monitoring of the control methods applied must be carried out regularly. Here's a checklist of points to cover:

- Are there procedures in place to ensure the work is being carried out correctly?
- Are the control measures effective – i.e. could you also monitor dust levels with dedicated equipment, given its small (oftentimes invisible) size?
- Have you involved all site personnel to help identify problems and find solutions?
- Is the equipment being properly maintained?

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Capture
Contain
Control

The 3C's® Methodology

Capture the hazard
Position the dust extraction hood as close as possible to the activity to ensure the dust is captured at source.

Contain the hazard
The immediate work area should be contained as much as possible to prevent dust/ fume migrating and affecting other workers on site or people nearby.

Control the hazard
Negative pressure can be applied to prevent dust migration outside of the work area.

Dust monitoring
Ask us about our MONITEX® Area Dust Monitoring systems, which are used for Industrial perimeter monitoring including construction and waste sites, quarries and mines, ports and bulk handling terminals, and transport hubs.

Engineering Controls for Silica Dust

If you can't eliminate, substitute or isolate the hazard, you will need to use effective and tested engineering controls.

Here is just a small selection of suitable dust extraction and filtration units offered by RVT Group:

DUSTEX® Wandafilta

The Wandafilta is a portable dust filtration case, designed to capture and remove the bulk of visible dust.

The filter case and fan are linked with 300mm ducting, and the individual items can be moved separately before being connected together in position. The capture hood should stay close to the source of the dust, while the filter case and fan are sited away from the works and/or outside the working area.

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DUSTEX® Clearblast 6000

Our DUSTEX Clearblast Filter Unit is a self-contained dust extractor designed to operate usually via a ductwork system extracting from the dust source.

As dust enters the Filter Unit, the hopper inlet internal baffle plate encourages heavier particles to fall into the waste bin.

Lighter dust particles are trapped by the filter media and clean air is discharged to atmosphere through the fan chamber outlet.

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