



Creative Safety Initiatives
It's better to be safe than sorry

10830NAT Course in Crystalline Silica Exposure Prevention

Student Resource Handbook



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Introduction

10830NAT Course in Crystalline Silica Exposure Prevention describes the skills and knowledge required to recognise the workplace health and safety risks and hazards of working with Silica dust and implementing safe systems of work for the prevention of exposure limiting the effects of silicosis on worker health.

Work Health and Safety (WHS) is a relationship between the health of the employee and the safety issues of his/her working environment.

WHS acknowledges the dual effect of the employer to provide a safe working environment and of the employee to fulfil his duties in a safe manner with neither party having a direct or indirect adverse effect on the health of self or others when working with dust.

The skills in this course must be applied in accordance with Commonwealth and State/Territory legislation, Australian/New Zealand standards and industry codes of practice.

The following icons are used throughout this resource to guide your learning:



This icon indicates there is a web link. These are in addition to hyperlinks you will find throughout the text. Where you see this icon, there is further information you can access relevant to the content to broaden your knowledge.



This icon indicates that an example or case study has been provided to help you determine how to apply this learning.



This icon indicates that there is learning checkpoint, with an activity to be completed. These checkpoints help you to reflect on your learning and help you to embed this information.

Chapter 1: What is Crystalline Silica Dust

Approximately half the compositions of earth's crust are silicon dioxide. Crystalline Silica is a basic component of soil, sand, granite and also found in stone, grout, bitumen, rock, gravel, glass, cement and clay and engineered stone.

Quartz is the most common form of crystalline silica. Cristobalite and Tridymite are two other forms of crystalline silica. All three forms may become respirable size particles when workers chip, cut, drill, or grind objects that contain crystalline silica.

Silica is a generic term commonly used to refer to crystalline silica including crystalline quartz. Silica has been a long standing health hazard, as far back as early civilisation, causing millions of cases of disease and deaths since stone masonry and mining began.

The impact of working with respirable crystalline silica is a topical issue that is receiving increasing attention due to the rising numbers of affected workers. Australia and other countries are witnessing a resurgence in diagnoses of silicosis disease in workers in mining, construction and now those who work with engineered stone.

1.1 Facts and Figures

The risk with silica dust arises through the inhalation of dusts containing crystalline silica.

In 2011 about 587,000 Australian workers were exposed to silica dust at work. It is estimated that 5758 of those will develop lung disease over the course of their life.

Worker presenting with silicosis, a condition that has also been known as, 'grinder's asthma' and 'potter's rot' is currently on the rise.

This current spike has been attributed to workplace exposure (often by tradesmen) to so-called engineered or artificial stone products often used for kitchen benchtops.



The Project

The Toxic Dust that Could Kill Aussie Tradies Video

1.2 Three Different Forms of Free Silica

There are three (3) different forms, also known as free Silica, but the one (1) predominantly found in work places is Quartz.

Free Silica is classified as pure crystalline silica that is not combined with any other element.

Quartz is the same basic material found in sand.

1.3 Quartz

Quartz is the most common form of crystalline silica.

There are many different varieties of quartz, several of which are semi-precious gemstones such as Clear quartz, milky quartz, rose quartz and smoky quartz.

Varieties of quartz have been the most commonly used minerals in the making of jewellery.



Images above show examples of Quartz (90+% Silica), Shale (30-60% Silica), Gyprock (5% Silica), Sandstone (70-90% Silica), Marble (5% Silica), Concrete (10-30% Silica), Brick (10-30% Silica) and Manufactured Stone (90+% Silica).

1.4 Cristobalite

Cristobalite can be found where heating of quartz containing materials occurs

Sometimes enters workplaces in filtering products or appears in foundries where quartz is affected by red hot metal as it is not sufficient for industrial use in its natural form.



1.5 Tridymite

A third form, tridymite, requires very high heat for its formations and would be unexpected in workplaces.





At the workplace, silicon dioxide may occur both in its crystalline form or combined with other minerals or materials.

Products found in workplaces include such products as bricks, tiles, concrete, artificial stone benchtops and some plastic materials.

https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0005/181940/Managing-respirable-crystalline-silica-dust-exposure-in-the-stone-benchtopy-industry-Code-of-Practice-2019.pdf



Video of the Dangers of Silica Dust

Chapter 2: Legislation

Current Legislation

Legislation plays an important part in specifying responsibilities and duties of employers and employees which means everyone has a duty of care when working with materials involving silica exposure, so far as is reasonably practicable, no person's health is to be affected by that work.

On 1 January 2012, the Work Health and Safety Act 2011 came into effect across Australia and describes the overarching legislation that governs safe work practices.

Legislation was developed by the Commonwealth government and seeks to;

"...provide a balanced and nationally consistent framework to secure the health and safety of workers and workplaces"

WorkSafe ACT website:

<https://www.accesscanberra.act.gov.au/app/home/workhealthandsafety/worksafect>



The Safe Work Australia website:

<http://www.safeworkaustralia.gov.au/sites/SWA>

https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0008/83186/silica_managing_workplace.pdf

<https://www.accesscanberra.act.gov.au/ci/fattach/get/284629/1552608708/redirect/1/filename/Silica+Dust+-+Guidance+Note.pdf>

Regulations have force of law and describe additional provisions to assist in the operation of the legislation.

Codes of Practice provide practical guidance in relation to specific WHS issues and hazards.

The relevant legislation and guidelines include by not limited to the following:

- Work Health and Safety Act 2011 (formerly known as Occupational Health and Safety or OH&S).
- Work Health and Safety Regulation 2011;
- Work Health and Safety Codes of Practice;
- Adopted national exposure standards for atmospheric contaminants in the occupational environment (NOHSC:1003(1995));
- Workplace exposure Standards for Airborne Contaminants 2018.

The Work Health and Safety Act 2011 (WHS Act) establishes a number of primary duties for the persons conducting a business or undertaking (PCBU).

This duty is paramount.

In other words, if a PCBU is involved in work with materials involving silica exposure, so far as is reasonably practicable, no person's health is to be affected by that work.

Under Part 2 Health and Safety duties, Division 2 Primary duty of care, section 19, the PCBU has a duty to ensure the workplace health and safety of workers.

Section 19 of the Act as it applies to the use of Silica in the work place including:

- Providing and maintaining a safe and healthy work environment;
- Providing and maintaining safe plant and structures for working with materials containing silica;
- Ensuring safe systems of work;
- Providing the safe use, handling and storage of plant, structures and substances;
- Providing information, instruction, training and supervision;
- Ensuring the workplace conditions are monitored for preventing injury and illness.

New Legislation introduced in 2022 has reinforced guidelines already recommended for workplaces. In the ACT it is now not permitted to direct or allow a worker to cut materials containing Silica without effective controls in place. These controls are:

- A continuous supply of water to the cutting area to reduce airborne Crystalline Silica produced by the cutting and at least one of the following additional measures;
- That the area where the cutting is taking place is isolated from the rest of the workplace;
- A Class H vacuum is attached to the tool used for cutting (a Class M vacuum can be used if the material contains less than 25% Silica);
- A local exhaust ventilation system is used AND respiratory protective equipment is worn.

PCBU's must ensure that these measures are being undertaken as well as ensuring any workers who may be exposed to airborne Crystalline Silica produced by the cutting are wearing appropriate respiratory protection.

WorkSafe ACT

Regulatory bodies (in ACT, this is called Worksafe ACT) serve an important role in ensuring the health and safety of all workers by acting to support and enforce the Act.

Additionally, they play a central role in education, compliance, inspectors, workers compensation, dangerous substances and policy and legislation.

WorkSafe ACT is responsible for administering, enforcing and educating industry on all matters pertaining to the Worker's Compensation Act 1951 and associated legislation



Contact Details

Website: www.worksafe.act.gov.au

Email: Worksafe@act.gov.au

Ph: (02) 6207 3000

Definition of Airborne Contaminants

- This is a contaminant in the form of a fume, gas, mist, vapour or dust and includes microorganisms. An airborne contaminant of this type is a potentially harmful substance that is either not naturally in the air or is present in an unnaturally high concentration to which workers may be exposed in their working environment.
- Managing risks for airborne contaminants is documented in the relevant legislation and guidelines. Due to the rising Silica Situation Safe Work Australia in April 2018, has produced a guideline that provides information on how to meet your duties under the WHS Act and Regulations.



Workplace Exposure Standards for Airborne Contaminants

<https://www.safeworkaustralia.gov.au/doc/workplace-exposure-standards-airborne-contaminants>

2.1 Responsibilities of Workers

WHS Act 2011 also specifies duties and responsibilities of employees whilst at work and these include the following:

- Take reasonable care for their own health and safety;
- Take reasonable care that their acts or omissions do not adversely affect the health and safety of others;
- Comply with any reasonable safety instruction;
- Cooperate with any reasonable policy or procedures.

2.2 Personal Protective Equipment (PPE)

Many risks can be minimised or avoided through understanding hazards and the continuous implementation of simple safety principles. Potential hazards, if they cannot be removed entirely or replaced with another method or equipment, must be handled with care. As an example, Personal Protective Equipment or PPE becomes a barrier for dust.

Equipment:	What it is used for:
Hand protection	Protects the hands.
Respiratory protection	Protects the lungs and air passages.
Hi-Vis clothing	Protects the skin and increases visibility.
Eye protection	Protect eyes and part of the face.
Hearing protection	Protects against hearing loss

Other workplaces may utilise bright reflective safety vests, safety shoes, hard hats or hearing protection depending on the tasks performed and hazards involved, for example if you need to attend a worksite to undertake work activities, you will need to adhere to the requirements of that worksite.

The PCBU must ensure Personal protective equipment is specific in requirements such as:

- Ensuring the PPE is suitable for the nature of the work;
- Ensuring the PPE is a suitable size and fit and reasonably comfortable for the worker to wear;
- Ensuring PPE is maintained, repaired or replaced so that it continues to minimise risk to the workers who use it;
- Providing workers with information, training and instructions in the proper use, storage and maintenance of PPE.

The Worker must:

- So far as the worker is reasonably able, use, wear the equipment in accordance with any information, training or reasonable instruction by the PCBU.
- The worker must not intentionally misuse or damage the equipment.
- The worker must inform the PCBU of any damage to, defect in or need to clean or decontaminate any of the equipment of which the worker becomes aware.

PPE Examples:



P1 disposable
Protection Factor 10



P1/P2 disposable
Protection Factor 10



Half face P2 Reusable Respirator
Protection Factor 10



Powered Air Purifying Respirator (PAPR)
Protection Factor 50



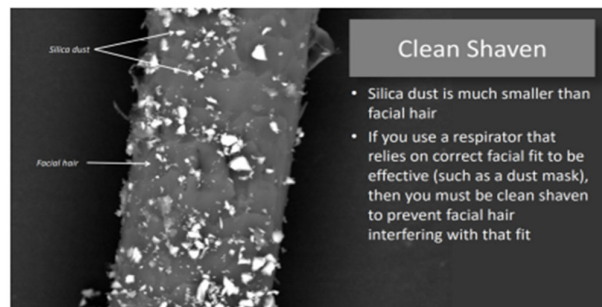
Full face Reusable Respirator with Disposable P3 Filters
Protection Factor 100



Replacement filters

**All these respirators require Face Fit-Testing to ensure correct size and fit.
Legislation states that respirators are an effective control measure for Silica Dust**

To ensure a strong seal, when disposable, half face reusable and full face reusable respirators are worn, the person **MUST** be clean shaven.



Chapter 3: Work and Exposure

If it is just sand, why is it hazardous?

When materials are worked on, silica is released as a fine dust known as respirable silica dust and is smaller than a grain of sand, so it is breathed in without the person knowing.

The reality is that Silica is so abundant in our natural resources, it's possible that you can use silica and don't even know it.

3.2 Industries and Occupations

Silica is widely encountered in extractive industries, in the manufacturing of many concrete based building materials.

Typical industries include but not limited to:

- Tunnelling
- Construction including granite grinding and polishing
- Foundries
- Stone masonry
- Cement manufacturing
- Power generation
- Ceramics
- Brick and tile manufacturing
- Metal polishing
- Abrasive blasting
- Mining
- Quarrying



Video Crystalline Silica Dust – Safe Work NSW

https://www.youtube.com/watch?time_continue=2&v=cpaLhmoy1tg

3.3 Airborne Particles (DUST)

You will be exposed to Silica dust if you cut, grind, saw, drill, crush or chisel in the following materials:

- Sand
- Granite
- Rock/Quartz
- Mortar
- Masonry
- Blocks
- Concrete

There are four factors that determine whether a dust/particles in the air are hazardous include:

- The type of particulate involved and its biological effect;
- The concentration of airborne particles in the area of the worker/person;
- The size of the particles the worker/person breaths in, and
- The duration of exposure to the particles.



YOU ARE AT RISK FOR SILICA DUST EXPOSURE IF YOU
CUT, GRIND, SAW, DRILL, CRUSH OR CHISEL IN THE FOLLOWING MATERIALS:

						
SAND	GRANITE	ROCK	MORTAR	MASONRY	BLOCK	CONCRETE



ENGINEERED STONE

Health Hazards

Health hazards are divided into two groups:

Inhalable dust hazards

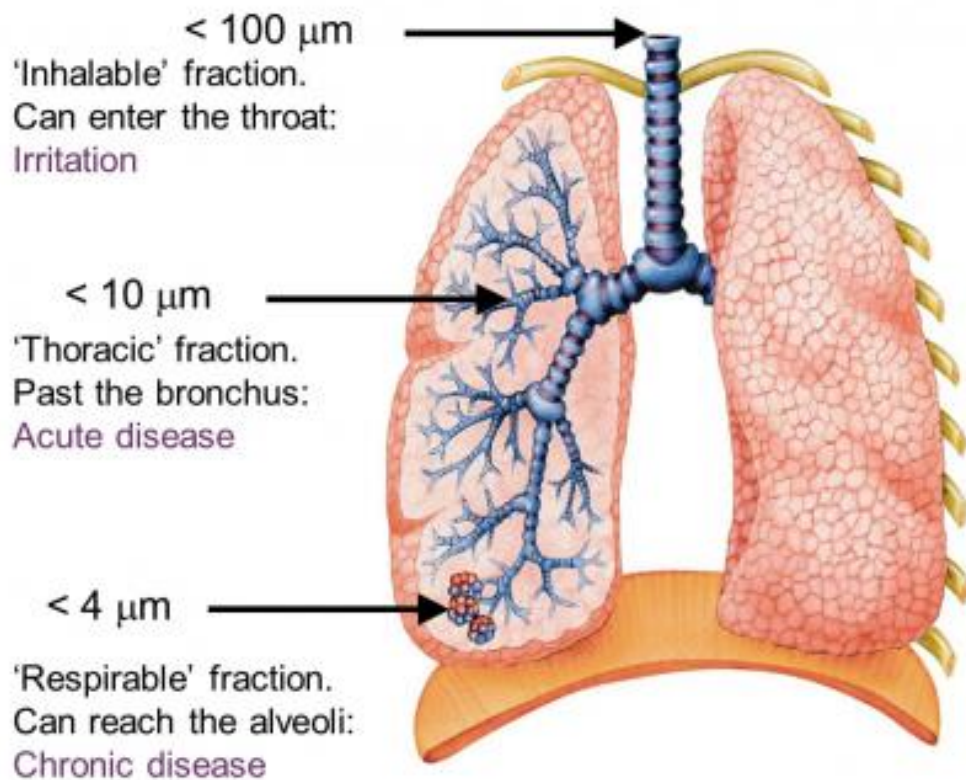
These are caused by larger dust particles that don't get into the lungs, but in the nose and tubes leading to the lungs and cause Bronchitis and Rhinitis.

Respirable dust hazards

This is when too much dust enters the lungs causing tissue damage or permanent serious illnesses.

3.4 Respirable dust

Respirable dust is the fraction of inhaled particles that penetrate to the alveolar region of the lung, with 50% penetration at 4. μm



Respirable Crystalline Silica

In order for the crystalline dust particles to reach the extremities of the lung where they have the potential to do damage, they must be particularly small (less than 10 µm in diameter) and this size is defined as "respirable".

The toxic form of this dust "respirable crystalline silica" or RCS.

Breathing in more than the amount of silica dust shown here per day, means you have exceeded the exposure limit of 0.05mg/m³.



Health Effects

How does it enter the lungs?

- Small silica dust particles can be generated when material containing silica are drilled, cut, blasted or crushed by machinery.
- The very small particles can then become airborne
- These dust particles can be inhaled and breathed into the lungs
- Dust passes through the airways into the small air sacs called alveoli, the dust can be deposited in the airways and air sacs.

3.5 Exposure and the lungs

Normally there is a balance between the amount of dust breathed into the lungs and the body's ability to get rid of it from the lungs.

The chance of becoming ill from exposure to silica dust depends on:

- The tasks performed (some minerals contain more silica than others).
- The amount of dust exposed to (low or high intensity exposure).
- The frequency of the exposed (over a long or short period of time).

Each exposure to silica adds into the total amount of silica in the lungs.

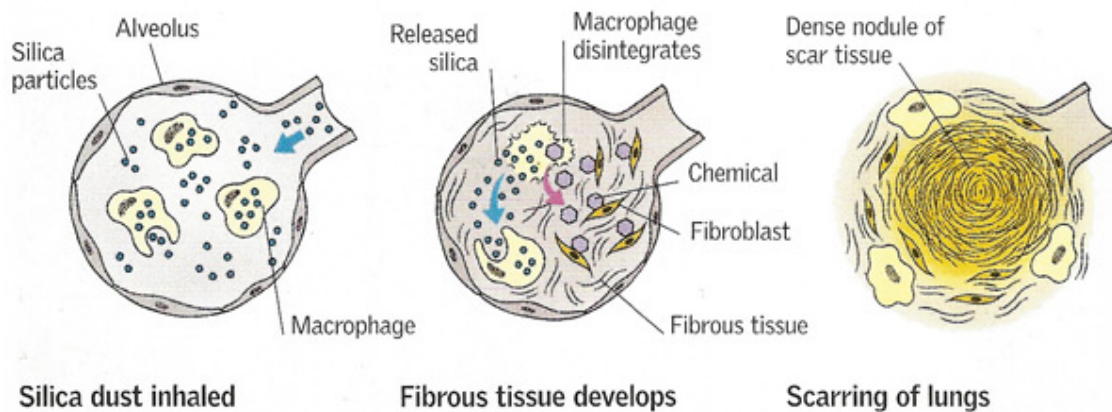
Those who have high intensity exposure over a shorter period of time have an increased risk.

The effect that this damage has on breathing depends upon:

- The amount of quartz dust retained in the lung
- The degree of the healing response
- The size of nodules
- The number of nodules seen on x-ray

Symptoms from silicosis may not be obvious and can initially include:

- Shortness of breath
- Chest pain, or
- A persistent cough



Health Effects

What is Silicosis?

- Silicosis is a fibrotic disease of the lungs caused by the inhalation and deposition of respirable crystalline silica in the lung tissue. It falls into the group of diseases known as pneumoconiosis. Silica exposure has been a well-known occupational hazard in sandblasting, tunnelling and mining among other workplaces for many years. Although silicosis is preventable, it remains prevalent worldwide, particularly in developing countries.
- Cases of silicosis were not common in Australia however there has been a recent significant increase in cases associated with the artificial stone industry.

Types of Silicosis

- There are several clinical and pathologic varieties of silicosis, based on the time taken to accumulate a total lung burden of crystalline silica sufficient to trigger a nodular fibrotic reaction in the lung.
- There are three major forms of Silicosis
- **Acute Silicosis** – occurs after short exposure to very high levels of silica. The condition causes rapidly progressive dyspnoea and death. This can also be days where massive exposures occur. Time of exposure to onset of symptoms: < 1 year.
- **Accelerated Silicosis** – is rare but can develop within two to five years with intense exposure to free silica.
- **Chronic (Nodular) Silicosis** – referred to as classic silicosis where a person has had exposure for more than 10 years. Time of exposure to onset of symptoms: Decades.

Silicosis	Inflammation and scarring in the form of nodules
Tuberculosis (TB)	<p>TB is a disease caused by infection with the bacteria Mycobacterium tuberculosis. TB can damage a person's lungs or other parts of the body and cause serious illness.</p> <p>TB is contagious and spread when an infected person, coughs, sneezes or speaks, sending germs into the air.</p>
Heart Disease	<p>Is an umbrella term for a range of conditions that affect your heart.</p> <p>Including: Heart rhythm problems, heart defects, coronary artery disease</p>
Lung Cancer	<p>Pain whilst breathing</p> <p>Cough – chronic, dry, severe or with blood</p> <p>Fatigue, loss of appetite or weakness</p>
Chronic Obstructive Pulmonary disease	<p>Affects Alveolar Surface</p> <p>Decreases Elasticity</p> <p>Prevents Oxygen/CO2 Exchange</p>

Silicosis is a NON-CURABLE DISEASE

Prevention through Safe Work Practices is Critical

3.6 Silicosis Diagnosis

If you work in an occupation with exposure to inhaled silica and have a cough, phlegm or breathing difficulty you should be evaluated for silicosis.

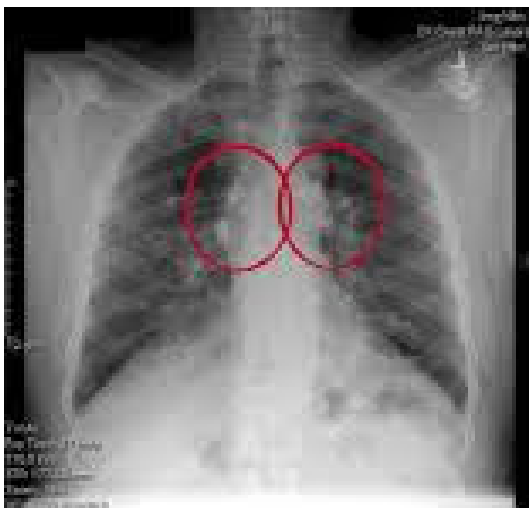
Over time, Silica can build up in your lungs and breathing passages which leads to scarring that makes it hard to breath.

Symptoms can appear from a few weeks to many years after exposure and typically worsens over time as scarring occurs.

A physical examination should be conducted with emphasis on the respiratory system and it's a good idea to get an annual checkup that includes collecting the following information to monitor for any changes.

Information such as:

- Work history
- Medical history
- Physical examination
- Lung function investigation consisting of standardised respiratory function tests and if required a chest X-ray, CT scan or biopsy.



How it Happens!

Dust Enters
the lungs

Travels
to the
Alveoli
(small air
sacs)

Fibrous
tissue
forms
around
the dust
particle

This is
known as
Fibrosis

Fibrosis
inhibits
the
exchange
of gases

Carbon
Dioxide
and
Oxygen

This causes
obstruction
of
breathing

Silicosis
Usually
occurs
slowly
due to
exposure
of long
periods
of time

National Silicosis Register

Slater and Gordon has a National Silicosis register to support Australians who have been exposed to the potentially fatal silica dust

Similar to the asbestos register, the Silicosis register allow people to register potential exposure and assist them to access appropriate medical and financial support

To register your exposure to Crystalline Silica, go to:

www.slatergordon.com.au/silica-exposure-registration-form

Silicosis Registers

The Australian Government provided \$5 million in 2019-20 to establish the Taskforce, support the establishment of a National Dust Diseases Registry and fund new research.

National: Department of Health and Aged Care | Occupational Dust Diseases

Qld: About the Notifiable Dust Lung Disease Register | Queensland Health

Vic: The Silica-Associated Lung Disease Projects - Monash Centre for Occupational and Environmental Health (MonCOEH)

Chapter 4: Workplace Exposure Standards Australia



Fact

Volcanoes mass produce crystalline silica in lava domes

Generates airborne fine grained ash rich in free crystalline silica



4.1 Exposure Standards

Workplace exposure standards are airborne concentrations of a particular chemical or substance in the workers breathing zone that should not cause adverse health effects or cause undue discomfort to all workers.

Exposure standards are legal concentration limits that must be adhered to.

An eight-hour time weighted (TWA) exposure standard is the average airborne concentration of a particular substance permitted over an eight hour working day and a 5 day working week.

These are the most common types of exposure standards.

NOTE:

8 hour TWA exposure standards may require adjustment where work shifts exceed 8 hours or for greater than a 5 day working week (Safe Work Australia). Example: If a worker works 60 hours instead of 40 hours the exposure standard will drop from 0.05mg/m³ to 0.03mg/m³.

Please note this adjustment should only be made by an occupational hygienist

4.2 Air Monitoring

The mandatory limit for silica dust exposure in Australia is 0.05mg/m³ averaged over an eight (8) hour day.

There is no evidence to support a safe level of silica dust exposure.

Work Health and Safety (WHS) Regulation 50 states a PCBU must carry out air monitoring if there is a health and safety risk or if there is potential of exceeding the exposure limit.

Air monitoring is undertaken by an Occupational Hygienist. Monitoring records must be made available to workers.

Air Monitors

Personal Dust Monitor worn by workers Static Sampler to monitor a general area



How Australia Compares to other Countries

Currently, Australia has a mandatory limit for silica dust exposure at $0.05\text{mg}/\text{m}^3$ averaged over an 8-hour day.

This is how Australia's Exposure Standard compares to other countries in regard to Crystalline Silica:

- Mexico $0.025\text{mg}/\text{m}^3$
- Portugal $0.025\text{mg}/\text{m}^3$
- Japan $0.03\text{mg}/\text{m}^3$
- **Australia $0.05\text{mg}/\text{m}^3$**
- USA $0.05\text{mg}/\text{m}^3$
- South Africa $0.1\text{mg}/\text{m}^3$
- United Kingdom $0.1\text{mg}/\text{m}^3$
- France $0.1\text{mg}/\text{m}^3$

Some of the methods other countries use to protect workers from dust include:

- Mandatory wet cutting.
- Providing respirators to workers
- Written exposure control plans.
- Offering medical exams.
- Restricting housekeeping practices like dry sweeping.

The CFMEU has made recent submissions to the National Dust Diseases Taskforce, calling for Workplace Exposure Standard (WES) of $0.02\text{mg}/\text{m}^3$ averaged over an 8-hour day as a matter of urgency.

Safety Data Sheets

What is a Safety Data Sheet (SDS)?

A safety data sheet (SDS) is the internationally accepted basis of supplying sound written scientific information on hazardous substances.

An SDS provides essential information that includes how to use substances safely, without harmful effects to people or the environment.

Throughout the industrialised world it is generally accepted that the manufacturer or the importer is the party who is responsible for the preparation of the Safety Data Sheet.

Safety Data Sheets must include the following information relevant to the specific substance or product:

1. Handling and storage;
2. Exposure controls and PPE;
3. Physical chemical properties;
4. Stability and reactivity;
5. Toxicological information;
6. Ecological information;
7. Hazard or hazard identification;
8. Identification of the substance or mixture and the supplier;
9. Other relevant information;
10. Regulatory information;
11. Transport information;
12. Disposal information;
13. First aid measures;
14. Firefighting measures;
15. Accidental Release measures;
16. Composition and information on ingredients.

Many silica containing materials and products are not necessarily considered hazardous according to the Globally Harmonised System (GHS) and therefore may not have a SDS. Product information sheets may hold the relevant info that they need too.

[The Globally Harmonized System of Classification and Labelling of Chemicals](#) (GHS) classifies chemicals by types of hazard. It helps you communicate information about hazardous chemicals on labels and safety data sheets.

Chapter 5: Risk Assessment

5.1 Hazards and Risks

The WHS Act and Regulations require persons who have a duty to ensure health and safety to 'manage risks' by eliminating health and safety risks so far as is reasonably practicable.

Hazard	Means a situation or thing that has the potential to harm a person.
Risk	Is the possibility that harm (death, injury or illness) might occur when exposed to a hazard
Risk Control	Means taking action to eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising the risks so far as is reasonably practicable.

5.2 Risk Assessment – Step by Step Process

A safe and healthy workplace does not happen by chance or guesswork.

You have to think about what could go wrong at your workplace and what the consequences could be.

You must do whatever you can (in other words, whatever is reasonably practicable) to eliminate or minimise health and safety risks arising from your business or undertaking.

Identify hazards

- Find out what could cause harm

Assess risks if necessary

- Understand the nature and harm that could be caused by the hazard, how serious the harm could be and the likelihood of it happening.

Control risks

- Implement the most effective control measures that are reasonably practicable in the circumstances.

Review control measures

- To ensure they are working as planned.

If you find a hazard in the workplace:

- Remove it / isolate it / put up a warning sign
- Complete a hazard report form.
- Advise a supervisor if I can't remove it myself.

Assessing Risk

Many hazards and their associated risks are well known and have well established and accepted control measures. In these situations, the second step to formally assess the risk is unnecessary.

If after identifying a hazard you already know the risk and how to control it effectively, you may simply implement the controls.



[Risk Management Process](#)

Risk Matrix

A risk matrix is often used during a risk assessment to measure the level of risk by considering the consequences/severity and likelihood of injury to a worker after being exposed to a hazard.

The two measures can then help determine the overall risk rating of the hazard.

Risk Matrix

Likelihood		Very Likely	Likely	Unlikely	Highly Unlikely
Consequences	Fatality	High	High	High	Medium
	Major Injuries	High	High	Medium	Medium
	Minor Injuries	High	Medium	Medium	Low
	Negligible Injuries	Medium	Medium	Low	Low

When using a risk matrix, the two (2) key components are:

Consequences: how bad would the most severe injury be if exposed to the hazard?

Fatality	Loss of life
Major Injuries	Serious damage to health which may be irreversible. Likely to require ongoing medical treatment and involve significant time off work
Minor Injuries	Reversible damage to health, with limited ongoing treatment. Less likely to involve significant time off
Negligible Injuries	First aid only, with little or no lost time (usually <1 day)

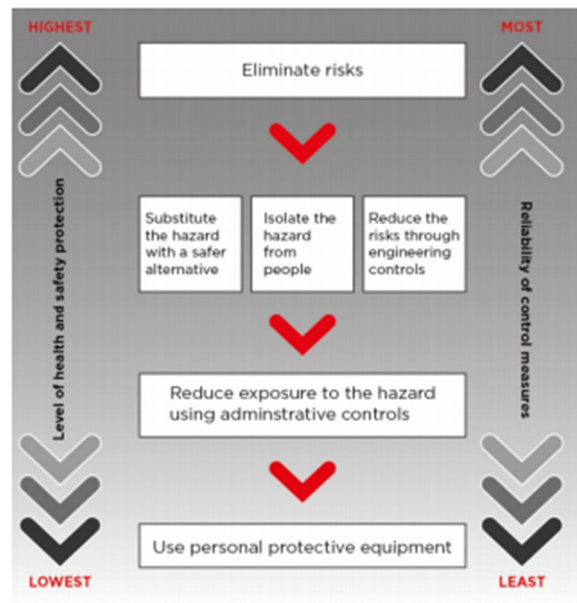
Likelihood: How likely is the person to be injured if exposed to the hazard?

Very Likely	It is expected to occur (e.g. continuous exposure to the hazard)
Likely	Will probably occur (e.g. regular exposure to the hazard)
Unlikely	Could occur at some time (only very occasionally exposed to the hazard)
Very unlikely	May occur only in exceptional circumstances

Once you have identified and assigned a risk rating to a hazard, effective controls should be implemented to protect workers. Working through the hierarchy of controls can be an effective method of choosing the right control measure to reduce the risk.

5.3 Hierarchy of Controls

The hierarchy of controls is a system used in industry to minimise or eliminate exposure to hazards.



The Hierarchy of Controls

The hierarchy of controls can be applied to any risk with the main intention to eliminate the risk as it's the most effective control.

If it's not practical to eliminate the risk, you must minimise the risk by working through other alternatives in the hierarchy.

1. Eliminate the Hazard

- a. If the hazard is eliminated, risk = 0

2. Minimise the Risk

- a. Substitution (with something safer)
- b. Isolation (of the risk)
- c. Engineering control

3. Implement Back-up Controls

- a. Administrative controls

b. Personal Protective Equipment (PPE)

Applying the Hierarchy of Controls

The WHS regulations make it mandatory for duty holders to work through this hierarchy when managing certain risks.

Elimination is the most effective with administrative controls and PPE the least effective.

Elimination

Often totally impractical when having to work with natural products such as sand, concrete, clays or processes such as tunnelling.

Substitution

Extremely advantageous when silica content of the materials being used can be reduced markedly e.g. Using aluminium polishing powders instead of silica powders, vacuuming instead of sweeping or using wet processes instead of dry.

Engineering

Dry cutting of manufactured stone is banned in several states in Australia and dry cutting of any quartz-containing product should not be performed.

- Containment – most effective when the process obliges continued use of silica containing material;
- Ventilation – highly effective when silica containing dust clouds cannot be completely contained at the source because of the need for worker to work with the materials;
- Suppression – water or fine mist suppression is also used to control dust clouds which are not always amendable to use of fixed point ventilation.
- On-tool dust suppression or extraction equipment used when cutting, drilling or grinding products with Silica in them.

Administrative Controls

Typically includes housekeeping, warning signage, but can also include restricting the time of exposure, rotation of workers away from dusty areas.

Respiratory protection PPE

Applicable and useful for short term applications when very expensive ventilation solutions are not warranted.

Very applicable where the source of dusts cannot be fully contained such as tunnelling, outdoor work, abrasive blasting or where particles are imparted with velocity beyond the capture capabilities of ventilation units.

SWMS Example: (BEST PRACTICE)

Scenario

A work group has urgent work to carry out on a busy footpath next to a road in the CBD. The task requires them to cut out a panel of footpath and carry out repair work on an underground utility. Due to the nature of the work, a SWMS is required for the group to carry out the work. Below is the SWMS, utilizing the Hierarchy of Control, and detailing how they will carry out the task while maintaining a safe working environment as well as protecting the general public from potential crystalline silica exposure.

Underground Joes ABN: 698469474-0 PO Box 1 ACT		Principal Contractor (PC)	Name: Water Authority ABN: 568760-884348 Address: PO Box 2 ACT
Works Manager:	Joe Blogg	Work Location:	London Circuit, Canberra
Contact Phone:	1234567890		
Work Activity:	Removal of a section of footpath		
High Risk Work involves:	<input type="checkbox"/> Risk of falls from greater than 2 metres	<input type="checkbox"/> Work on a telecommunications tower	<input type="checkbox"/> Demolition of load-bearing structure
	<input type="checkbox"/> Likely to involve disturbing asbestos	<input type="checkbox"/> Temporary load-bearing support structures	<input type="checkbox"/> Work in confined spaces
	<input type="checkbox"/> Work in or near shaft or trench with an excavated depth greater than 1.5m or a in tunnel	<input type="checkbox"/> Use of Explosives	<input type="checkbox"/> Work on or near pressurised gas pipes or mains
	<input type="checkbox"/> Work on or near chemical, fuel or refrigerant lines	<input type="checkbox"/> Work on or near energised electrical installations or services	<input checked="" type="checkbox"/> Work in an area with contaminated or flammable atmosphere
	<input type="checkbox"/> Work with tilt up or pre-cast concrete	<input checked="" type="checkbox"/> Work on, in or adjacent to road, rail shipping or other major traffic corridor	<input type="checkbox"/> Work in an area with movement of powered mobile plant
	<input type="checkbox"/> Work in or areas with artificial extremes of temperature	<input type="checkbox"/> Work in or near a drowning risk	<input type="checkbox"/> Diving work
	<input type="checkbox"/> Other [please specify]:		
Has the SWMS been developed based on a site-specific risk assessment?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO [Note: A Access Canberra inspector may ask to sight evidence of this risk assessment]	Have workers and their HSR[s] been consulted about the SWMS?	Workers: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO HSRs: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Name[s] of workers consulted	D Murphy, S Helliwell, C Gonzalez, G Brooker	Date received:	

Worker signature[s]	DM, SH, CG, GB		
Person Responsible for ensuring compliance with SWMS	D Murphy	Date SWMS Provided to PC:	
Person(s) Responsible for reviewing the SWMS	G Brooker	Last SWMS Review Date:	
Date received:		Signature:	

What are the tasks involved?	What are the hazards and risks? (What is the problem?)	What are the control measures? (Describe the control measures and how they will be used)
Think about the workplace and each stage of the work, including preparation and clean-up.		
	Identify the hazards and risks that may cause harm to workers or the public.	Describe what will be done to control the risk. What will you do to make the activity as safe as possible?
Barricade Area	Pedestrians/General Public/Traffic	Apply traffic control to close one lane and divert pedestrians (10m exclusion zone) (Engineering) Place hard barricading, signage and a sentry to prevent the exclusion zone from being entered (Engineering)
Cut and Remove Panel	Airborne dust (contains silica)	Advise neighbouring businesses/residences of the work being undertaken (prior to work commencing) (Administration) Trained and competent people carrying out the work (Administration) Correct PPE – Minimum P2 dust mask (PPE) Dust suppression fitted to the saw and/or applied by another worker (Engineering) Air monitor in place, observed by sentry (Engineering) Wet pieces down before transport (Engineering)
	Weight of Panel	Cut into manageable pieces for handling (Engineering)
	Excessive Noise	Wear hearing protection (PPE)
Clean up area and Remove Barricading	Airborne dust (contains silica)	Correct PPE – Minimum P2 dust mask (PPE) Place tools and equipment into sealed bags/containers for safe transport and later use (Engineering/Isolation)

		<p>Clean affected area with appropriate tooling (Shovels) (Engineering)</p> <p>Wet any potentially contaminated areas (Engineering)</p> <p>Place all disposable materials into a sealed bag and place into another sealed bag and label for disposal (Isolation)</p>

Implementation

<p>How have relevant workers been provided with information and instruction so that they understand the hazards arising from this work, understand and can implement the identified control measures, and know what to do if the work is not being conducted in accordance with this SWMS?</p>	<p>Pre-Start meeting prior to the work being carried out.</p>
<p>What measures are in place to ensure that work is being carried out in accordance with the SWMS once work commences?</p>	<p>Water Authority Representative will be available to observe.</p>

5.5 Controls

You want to implement the best control for the risk identified because you want to control the hazard at the source and not rely on human behaviour and supervision.

You will have a full assessment of the situation so you must adapt the control measures you implement to suit the hazard, your workplace, your workplace policies and procedures and the health and safety of all.

Some examples of controls include but are not limited to:

- Using other materials (e.g. autoclaved aerated concrete) in place of masonry;
- Planning buildings with pre-built recesses for plumbing, gas and wiring;
- Ordering the correct fitting materials;
- Getting materials cut to size off site;

- Use fibre cement sheet shears instead of circular saw;
- Ensure the rock-drilling machines, have dust suppression features;
- Vehicles should have a dust collection system and an air conditioned cab with a filtered air supply – filters should be cleaned and maintained regularly;
- Have enclosures or hoods and local exhaust ventilation to remove the dust at the point its produced;
- WHS Regulations do not allow abrasives containing silica. Use metallic shot, slag products instead of sand. During blasting, containment methods such as blast- cleaning machines, cabinets and local exhaust should be used;
- Use local exhaust that fits directly onto the hand-held machines. This is the most effective way of controlling dust;
- Water should be used through non-electric tools to wet 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;
- Ensure equipment and work areas are cleaned regularly with water. Use water spray or rubber curtains around conveyor transfer points.

Important Information on Controls

Respiratory Protective Equipment

No respiratory protective equipment (RPE) can prevent all silica dust from being breathed in and should be used in combination with other controls.

RPE cannot protect you if it doesn't fit correctly.

The PCBU should have workers fit tested and trained in their use and maintenance.

Smoking

- Smoking reduces the lung's ability to clear dust and increases the risk of lung cancer.

Clothing

- If you wear disposable clothing at work, before you leave work, shower and change into clean clothes.
- Do not take dusty clothes home to wash.
- Vacuum dusty work clothes before leaving the work area or dust them by hand next to the extraction system while wearing a respirator.

- Launder dusty work clothes at the workplace to avoid taking them home. If using a commercial laundry, dampen the clothes and place them in a sealed, labelled plastic bag and inform the laundry that the clothes are contaminated with crystalline silica dust.
- Display warning signs if tasks create silica dust. Rotate staff to limit the time they are exposed.



Housekeeping

- Locate silica dust work outdoors, away from other workers. If not possible, enclose the area with floor to ceiling plastic sheeting.
- Do NOT clean up with compressed air or by dry sweeping. Dust should be removed using an industrial HEPA filter vacuum, which should be cleaned and maintained regularly.

Regulations Managing Risk

The duty to manage work health and safety risks is placed on persons conducting a business or undertaking (PCBUs), which also includes designers, manufacturers, importers and suppliers of plant, substances or structures that are used for work.

In managing risk from airborne contaminants:

- The person is not certain on reasonable grounds whether or not airborne concentration of the substance or mixture exceeds the relevant exposure standard;
- Monitoring is necessary to determine whether there is a risk to health;
- A PCBU must ensure that the results of air monitoring carried out, are recorded and kept for 30 years after the date the record is made;

- A PCBU must ensure that the results of air monitoring carried out, are readily accessible to persons at the workplace who may be exposed to the substance or mixture.

Control Measures

A duty holder must review and as necessary, revise control measures implemented so as to maintain, so far as reasonably practicable, a work environment that is without risks to health and safety.

The duty holder must review and, as necessary revise control measures in the following circumstances:

- The control measure does not control the risk it was implemented to control;
- A new relevant hazard or risk is identified;
- Before a change at the workplace that is likely to give rise to a new or different risk to health and safety that the measure may not effectively control.

WorkSafe ACT on 1 January 2012 released a code of practice on how to manage work health and safety risks.



How to Manage Work Health and Safety Risks – Code of Practice 2011

<https://www.legislation.act.gov.au/ni/2011-749/default.asp>

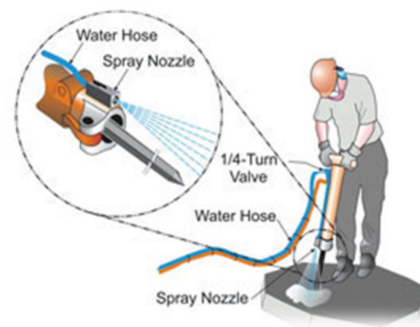
Dust Control Systems

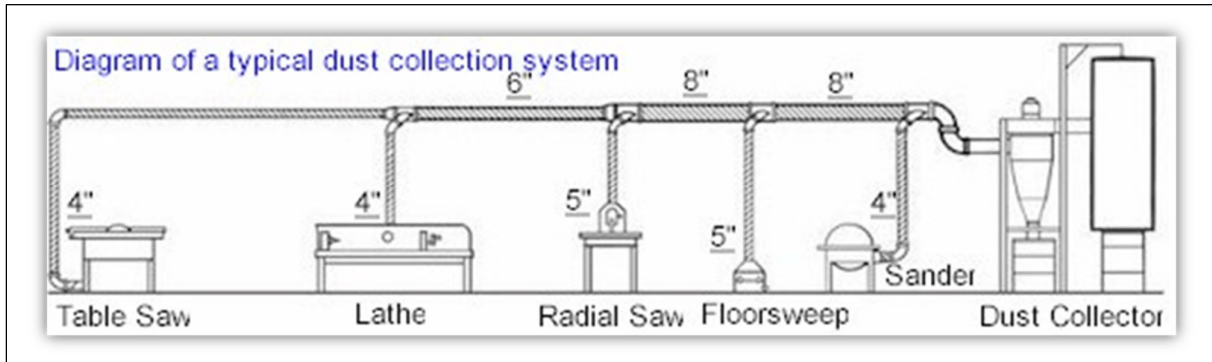


<https://www.bosch-pt.com.au/au/en/dust-solutions/>

<https://www.youtube.com/watch?v=198mEImmWO8>

<https://youtu.be/i5oHaIvC20k>





WARNING!
**Crystalline Silica
Work Area**

**Improper handling or exposure
to the dust may cause silicosis
(a serious lung disease) and death.**

**RESPIRATOR
REQUIRED**

Reporting Adverse Health Monitoring



Health Monitoring Report CRYSTALLINE SILICA

This [health monitoring report](#) is a **confidential** health record and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with the consent of the worker. These are to be filled out by a medical practitioner (Doctor).

There are two sections. Complete both sections and all questions if applicable.

Section 1 is to be forwarded to the PCBU who has engaged your services. A copy of laboratory report(s) must be attached > > >

Section 2 may contain confidential information which may not be relevant to the health monitoring program being carried out. This section should be retained by the medical practitioner. Information which is required to be given to the PCBU should be summarised in part 7 of section 1.

SECTION 1 – THIS SECTION TO BE RETURNED TO THE PCBU

1. PERSON CONDUCTING A BUSINESS OR UNDERTAKING			
Company / Organisation name:			
Site address:		Suburb:	Postcode:
Site Tel:	Site Fax:	Contact Name:	
2. OTHER BUSINESSES OR UNDERTAKINGS ENGAGING THE WORKER			
Company / Organisation name:			
Site address:		Suburb:	Postcode:
Site Tel:	Site Fax:	Contact Name:	
3. WORKER			(✓) all relevant boxes
Surname:		Given names:	
Date of birth: DD/MM/YYYY	Sex:	<input type="checkbox"/> Male	<input type="checkbox"/> Female
Address:		Suburb:	Postcode:
Current Job:		Tel(H):	Mob:
Date started employment : DD/MM/YYYY			
4. EMPLOYMENT IN CRYSTALLINE SILICA RISK WORK			(✓) all relevant boxes
• <input type="checkbox"/> New to crystalline silica work			
• <input type="checkbox"/> New worker but not new to crystalline silica work			

- Current worker continuing in crystalline silica work
- Worked with crystalline silica since DD/MM/YYYY
- Satisfactory personal hygiene (for example nail biting, frequency of hand washing) Yes No
- Risk assessment completed Yes No

5. WORK ENVIRONMENT ASSESSMENT (✓) all relevant boxes

Date of assessment: DD/MM/YYYY

Crystalline Silica Industry	
<input type="checkbox"/> Excavation/Earth Moving <input type="checkbox"/> Drilling Plant <input type="checkbox"/> Clay/Stone Processing <input type="checkbox"/> Paving/Surfacing <input type="checkbox"/> Mining <input type="checkbox"/> Construction <input type="checkbox"/> Abrasive Blasting <input type="checkbox"/> Foundry Casting <input type="checkbox"/> Other (specify): _____	<p>Controls:</p> <p>Respirator use <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Local exhaust ventilation (if indoors) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Overalls / work clothing <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Laundering by employer <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Wash basins & showers (with hot & cold water) <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Wet handling methods used where possible <input type="checkbox"/> Yes <input type="checkbox"/> No</p>
	<p>Personal hygiene:</p> <p>Clean Shaven <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Shower & change into clean clothes at end of shift <input type="checkbox"/> Yes <input type="checkbox"/> No</p>

6. BIOLOGICAL MONITORING RESULTS Include at least the previous two test results (if available)

	Date	Tests performed	Recommended Action and/or Comment
1.	DD/MM/YYYY	Last Chest X-Ray DD/MM/YYYY	Results: Normal / Abnormal _____
2.	DD/MM/YYYY	Spirometry	Results: FEV ₁ _____; FVC _____ FEV ₁ /FVC _____
3.	DD/MM/YYYY		
4.	DD/MM/YYYY		
5.	DD/MM/YYYY		
6.	DD/MM/YYYY		
7.	DD/MM/YYYY		
8.	DD/MM/YYYY		

7. RECOMMENDATIONS (by Medical Practitioner)		(✓) all relevant boxes
1.	<input type="checkbox"/> Suitable for work with crystalline silica	
2.	<input type="checkbox"/> Counselling required	
3.	<input type="checkbox"/> Review workplace controls	
4.	<input type="checkbox"/> Repeat health assessment (including any tests) in _____ month(s) / _____ week(s) Specify tests to be repeated: _____	
5.	<input type="checkbox"/> Removal from work with crystalline silica	On DD/MM/YYYY
6.	<input type="checkbox"/> Medical examination by Medical Practitioner	On DD/MM/YYYY
7.	<input type="checkbox"/> Fit to resume work	From DD/MM/YYYY
8.	<input type="checkbox"/> Referred to Medical Specialist (respiratory/dermatology/other): Specialist's name:	On DD/MM/YYYY
Additional comments or recommendations arising from health monitoring:		
Medical Practitioner (responsible for supervising health monitoring)		
Name:		Date: DD/MM/YYYY
Signature		
Tel:	Fax:	Registration Number:
Medical Practice:		
Address:	Suburb:	Postcode:

Sydney Safety Training

SECTION 2 – THIS SECTION TO BE RETAINED BY THE MEDICAL PRACTITIONER

This questionnaire also allows for recordings of a more general health assessment at the end, if applicable.

1. PERSON CONDUCTING A BUSINESS OR UNDERTAKING			
Company / Organisation name:			
Site address:	Suburb:	Postcode:	
Site Tel:	Site Fax:	Contact Name:	
2. OTHER BUSINESSES OR UNDERTAKINGS ENGAGING THE WORKER			
Company / Organisation name:			
Site address:	Suburb:	Postcode:	
Site Tel:	Site Fax:	Contact Name:	
3. WORKER (✓) all relevant boxes			
Surname:		Given names:	
Date of birth: DD/MM/YYYY	Sex:	<input type="checkbox"/> Male	<input type="checkbox"/> Female
Address:	Suburb:	Postcode:	
Current Job:	Tel(H):	Mob:	
Date started employment : DD/MM/YYYY			

This questionnaire is based on the MRC (UK) Respiratory Questionnaire 1986, which has been extensively validated. This questionnaire is intended to be completed by an interviewer rather than by the patient. Additional questions have been added to cover clinical aspects of bronchial hyper-responsiveness validated by the Department of Occupational and Environmental Medicine, National Lung Institute¹.

The British Occupational Health Research Foundation (BOHRF)² concluded that in the clinical setting, questionnaires that identify symptoms of wheeze and/or shortness of breath which improve on days away from work or on holidays have a high sensitivity, but relatively low specificity for occupational asthma.

Preamble

I am going to ask some questions, mainly about your chest. I would like you to answer **yes** or **no** whenever possible.

If the subject is disabled from walking from a condition other than heart and lung disease, please begin questionnaire at **Question 5** and mark the adjacent box.

¹ Venables KM, Farrer N, Sharp L, Graneek BJ, Newman Taylor AJ, 'Respiratory Symptoms Questionnaire for Asthma Epidemiology: Validity and Reproducibility', *Thorax*, vol 48, pp 214-219, 1993.

² The British Occupational Health Research Foundation (BOHRF), *Guidelines for Prevention, Identification and Management of Occupational Asthma: Evidence Review and Recommendations*, London 2004. www.bohrf.org.uk

4. BREATHLESSNESS AND WHEEZING

During the last month:

1. Are you troubled by shortness of breath when hurrying on level ground or walking up a slight hill?
 Yes No
2. **If Yes to 1** - Do you get short of breath walking with other people of your age on level ground?
 Yes No
3. **If Yes to 2** - Do you have to stop for breath when walking at your own pace on level ground?
 Yes No
4. If you run, or climb stairs fast do you ever
- a. cough? Yes No
 - b. wheeze? Yes No
 - c. get tight in the chest? Yes No
5. Is your sleep ever broken
- a. by wheeze? Yes No
 - b. difficulty in breathing? Yes No
6. Do you ever wake up in the morning (or from your sleep if a shift worker)
- a. with wheeze? Yes No
 - b. difficulty with breathing? Yes No
7. Do you ever wheeze
- a. if you are in a smoky room? Yes No
 - b. if you are in a very dusty place? Yes No
8. **If Yes to either Q5, Q6, Q7** - Are your symptoms better
- a. at weekends (or equivalent if shift worker)? Yes No
 - b. when you are on holidays? Yes No
- If **Yes to Question 8**, please record details of any occupational exposure to respiratory hazards e.g. isocyanates, wood dust, aluminium pot room or asbestos, in **Additional notes**.

5. COUGH

9. Do you usually cough first thing in the morning in winter? Yes No
10. Do you usually cough during the day/ or at night / in the winter? Yes No
11. **If Yes to Q9 or Q10** – Do you cough like this on most days for as much as three months each year?
 Yes No

6. PHLEGM

12. Do you usually bring up phlegm from your chest first thing in the morning in winter?
 Yes No
13. Do you usually bring up any phlegm from your chest during the day / or at night / in winter?
 Yes No
14. **If Yes to Q12 or Q13** – Do you bring up phlegm like this on most days for as much as three months each year?
 Yes No

7. PERIODS OF COUGH AND PHLEGM

15. In the past three years, have you had a period of (increased) cough and phlegm lasting for three weeks or more? Yes No

16. **If Yes to Q15** – Have you had more than one such episode? Yes No

8. CHEST ILLNESSES

17. During the past three years, have you had any chest illness that has kept you from your usual activities for as much as a week? Yes No

18. **If Yes to Q17** – Did you bring up more phlegm than usual in any of these illnesses? Yes No

19. **If Yes to Q18** – Have you had more than one illness like this in the past three years? Yes No

9. PAST ILLNESSES

20. Have you ever had, or been told that you have had any of the following?
- a. An injury, or operation affecting your chest? Yes No
 - b. Heart problems? Yes No
 - c. Bronchitis? Yes No
 - d. Pneumonia? Yes No
 - e. Pleurisy? Yes No
 - f. Asthma? Yes No
 - g. Other chest trouble? Yes No
 - h. Hay fever? Yes No

10. TOBACCO SMOKING

21. Do you smoke? Yes No

22. **If No to Q21**
Have you ever smoked as much as one cigarette a day for as long as one year? Yes No

23. How old were you when you started smoking regularly? _____

24. a. Do (did) you smoke manufactured cigarettes? Yes No
If Yes to Q24a: How many do (did) you usually smoke per day? _____
b. on weekdays? _____
c. at weekends? _____

25. Do(did) you smoke any other forms of tobacco? Yes No
If Yes to Q25, record details under Additional Notes

11. FOR EX-SMOKERS

26. When did you give up smoking? Month _____ Year _____

Additional notes:

12. GENERAL HEALTH ASSESSMENT (if applicable)		
Symptoms of:	Comments	Further testing?
Skin disorders		<input type="checkbox"/> Yes <input type="checkbox"/> No
Headaches, dizziness		<input type="checkbox"/> Yes <input type="checkbox"/> No
Respiratory disorders		<input type="checkbox"/> Yes <input type="checkbox"/> No
Irritation of eyes, nose or throat		<input type="checkbox"/> Yes <input type="checkbox"/> No
Cough		<input type="checkbox"/> Yes <input type="checkbox"/> No
CNS		<input type="checkbox"/> Yes <input type="checkbox"/> No
Others		<input type="checkbox"/> Yes <input type="checkbox"/> No
Height _____cm Weight _____kg Bp ____/____ mmHg		<input type="checkbox"/> Yes <input type="checkbox"/> No
13. OTHER MEDICAL HISTORY, FAMILY MEDICAL HISTORY, CURRENT MEDICATION, COMMENTS, TESTS OR RECOMMENDATIONS (use separate sheet if necessary)		
Medical Practitioner (responsible for supervising health monitoring)		
Name:	Signature	Date: DD/MM/YYYY
Tel:	Fax:	Registration Number:
Medical Practice:		
Address:	Suburb:	Postcode:

What should you do!

Safety First!

- Read the SDS;
- Follow instructions on correct precautions when exposed to dust;
- Wear the correct PPE for the task and ensure the PPE is a correct fit (fit-tested);
- Report to Safety Representative or Supervisor if you feel your work environment is unsafe;
- Report any illness due to air contamination.

What should you know!

All workers should find out about any airborne hazards in their workplace

Important information you should know includes:

- Type of airborne hazard;
- Safe exposure levels;
- Measures to minimise impact;
- Where to obtain Safety Data Sheets;
- Is training required?
- What personal protective equipment is required?

Glossary

The following are definitions of some of the key terms used throughout this workbook;

Term	Definition
Duty of care	a moral or legal obligation to ensure the safety or well-being of others. "employers have a duty of care to their employees"
Hazard	A hazard is a situation that poses a level of threat to life, health, property, or environment.
Risk	A situation involving exposure to danger, harm or loss.
Codes of Practice	Codes of practice are practical guides to achieving the standards of health, safety and welfare required under the Work Health and Safety (WHS) Act and the WHS Regulations in a jurisdiction.
Legislation	The process of making or enacting laws.
Regulation	A rule or directive made and maintained by an authority. The action or process of regulating or being regulated.
Mandatory	Required by law or mandate, compulsory
Protective equipment	Personal protective equipment (PPE) refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.
Regulatory bodies	A regulatory agency (also regulatory authority, regulatory body or regulator) is a public authority or government agency responsible for exercising autonomous authority over some area of human activity in a regulatory or supervisory capacity.
Incident	An instance of something happening; an event or occurrence.
Safe housekeeping	General care, cleanliness, orderliness, and maintenance of business or property. Good housekeeping is an important consideration in underwriting of fire hazard and other forms of insurance, as well as in certification by fire, health, and industrial safety agencies.
Stress	State of mental or emotional strain, pressure or tension resulting from adverse or demanding circumstances.

Source: [Safe Work Australia](#)

Section 50 Work Health & Safety Regulation

Managing airborne contaminate levels

50 Monitoring airborne contaminant levels

(1) A person conducting a business or undertaking at a workplace must ensure that air monitoring is carried out to determine the airborne concentration of a substance or mixture at the workplace to which an exposure standard applies if—

(a) the person is not certain on reasonable grounds whether or not the airborne concentration of the substance or mixture at the workplace exceeds the relevant exposure standard; or

(b) monitoring is necessary to determine whether there is a risk to health.

(2) A person conducting a business or undertaking at a workplace must ensure that the results of air monitoring carried out under subsection

(1) are recorded, and kept for 30 years after the date the record is made.

Maximum penalty:

(a) in the case of an individual—\$1 250; or

(b) in the case of a body corporate—\$6 000. Note Strict liability applies to each physical element of each offence under this regulation, unless otherwise stated (see s 6A).

(3) A person conducting a business or undertaking at a workplace must ensure that the results of air monitoring carried out under subsection

(1) are readily accessible to persons at the workplace who may be exposed to the substance or mixture.

Maximum penalty:

(a) in the case of an individual—\$6 000; or

(b) in the case of a body corporate—\$30 000. Note Strict liability applies to each physical element of each offence under this regulation, unless otherwise stated (see s 6A).

References (found in in-text hyperlinks)

Quartz Mineral By Max.kit - Own work, CC BY-SA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=54399641>

www.sibelco.com/materials/cristobalite/

<http://www.safeworkaustralia.gov.au/sites/SWA>

<https://www.safeworkaustralia.gov.au/contacts-your-stateterritory/contacts-australian-capital-territory>

<https://www.safeworkaustralia.gov.au/doc/workplace-exposure-standards-airborne-contaminants>

<https://www.safework.sa.gov.au/resources/how-manage-work-health-and-safety-risks>

Safe Work Australia Crystalline Silica fact sheet: Baseline health monitoring before starting work in a crystalline silica process

<https://www.osha.gov/>

<https://www.safeworkaustralia.gov.au/book/model-code-practice-how-manage-work-health-and-safety-risks#logo>

<https://safetyculture.com/topics/risk-assessment/>

Hierarchy of Controls Diagram Managing Risk CoP

<https://www.safeworkaustralia.gov.au/doc/crystalline-silica-health-monitoring>

<https://www.bosch.com.au/>

https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0005/181940/Managing-respirable-crystalline-silica-dust-exposure-in-the-stone-benchtopy-industry-Code-of-Practice-2019.pdf

https://www.worksafe.qld.gov.au/_data/assets/pdf_file/0008/83186/silica_managing_workplace.pdf

<https://www.breathefreelyaustralia.org.au/>

<https://respsfit.org.au/>